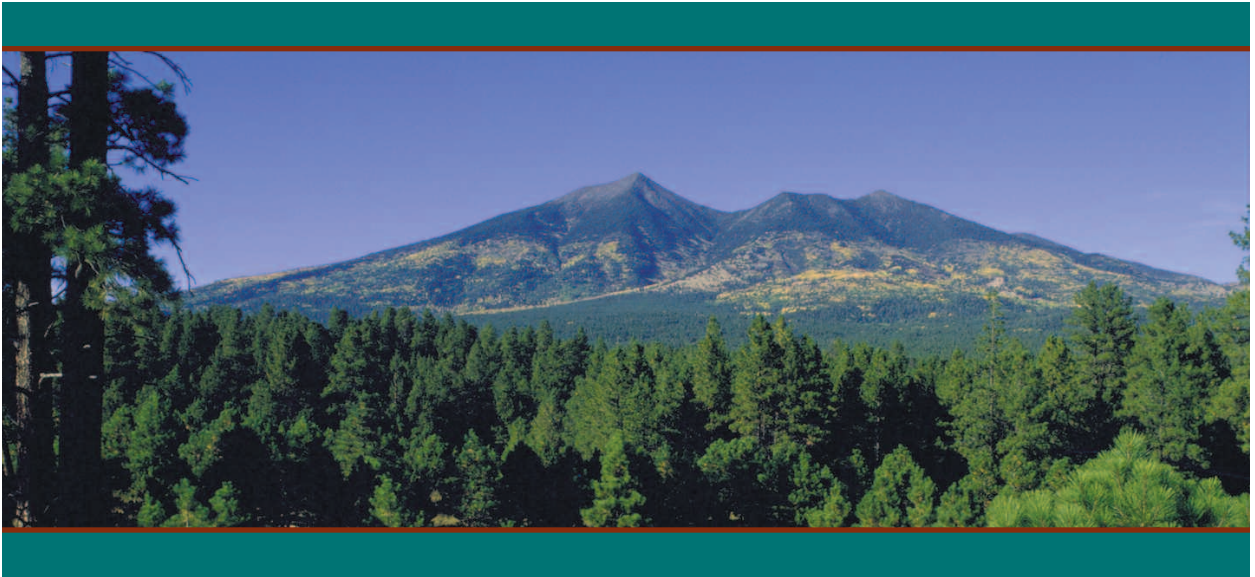


Coconino County **FOOD MANAGERS' COURSE**



2500 N. Fort Valley Road
Building 1
Flagstaff, Arizona 86001
TEL 928.679.8760
FAX 928.679.8771



Food Managers' Course Manual



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For more information about this manual, contact:

Environmental Health
Coconino County Health Department
2500 N. Fort Valley Road, Building #1
Flagstaff, AZ. 86001

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INTRODUCTION

Each year millions of people eat out and the trend of eating out continues to grow with each passing year. Food industry has grown as well in response to the increased demand. Food facilities are a unique business faced with the challenge of providing quality food that is safe to consume. At minimum, this involves safely storing, transporting, preparing food, and taking reasonable precautions against disease and injury. Although the specific nature and complexity of the food services may vary greatly, it is possible to generalize about the things they need to know and do to fulfill their obligations to their clients.

Simply stated, food operators are required to take reasonable steps to prevent food borne illnesses. This entails learning about food borne diseases to which clients may become exposed, and techniques for minimizing the risk of illness. The responsibilities of a food manager are many, and may at times seem overwhelming. Fortunately, most of the health risks posed may be easily overcome by following the simple procedures described in this manual.

Managers who learn and implement the practices recommended in this manual will be doing a great service, both to their clients and to the food industry.

Disclaimer

This manual is based on the 2005 Food & Drug Administration (FDA) Food Code that was adopted by the State of Arizona and Coconino County Health Department. However, there are several parts of this manual that are stricter than the FDA and Arizona State Food Codes. Food managers who are uncertain about the impact of local or state laws are urged to consult their local or state agencies.



TABLE OF CONTENTS

ii	Introduction
1	Definitions
15	1. Diseases
37	2. Licenses/Inspections/Enforcement
41	3. Food Management Responsibilities
45	4. Food Controls
55	5. Food Equipment
59	6. Employee Hygiene
63	7. Cross Contamination
71	8. Dishwashing and Sanitizing
77	9. Hazard Analysis Critical Control Points (HACCP)
79	10. Pest Control and Chemicals
87	11. Physical Facilities
91	12. Plan Review Procedures
103	Index
105	Answers to Quizzes
117	Temperature Control Requirements
119	Smoke-Free Arizona Act
121	Cooling Chart
122	Food Safety Evaluation Form
125	References



DEFINITIONS

The following definitions apply in the interpretation and application of this Code:

Accredited program.

- (a) **Accredited program** means a food protection manager certification program that has been evaluated and listed by an accrediting agency as conforming to national standards for organizations that certify individuals.
- (b) **Accredited program** refers to the certification process and is a designation based upon an independent evaluation of factors such as the sponsor's mission; organizational structure; staff resources; revenue sources; policies; public information regarding program scope, eligibility requirements, re-certification, discipline and grievance procedures; and test development and administration.
- (c) **Accredited program** does not refer to training functions or educational programs.

Additive.

- (a) **Food additive** has the meaning stated in A.R.S. § 36-901(7).
- (b) **Color additive** has the meaning stated in A.R.S. § 36-901(2).

Adulterated means possessing 1 or more of the conditions enumerated in A.R.S. § 36-904(A).

- (a) **Agency** means any board, commission, department, office, or other administrative unit of the federal government, the state, or a political subdivision of the state.
- (b) **Applicant** means the following PERSON requesting a LICENSE:
 - (i) If an individual, the individual who owns the FOOD ESTABLISHMENT;
 - (ii) If a corporation, any 2 officers of the corporation;
 - (iii) If a limited liability company, the designated manager or, if no manager is designated, any 2 members of the limited liability company;
 - (iv) If a partnership, any 2 of the partners;
 - (v) If a joint venture, any 2 individuals who signed the joint venture agreement;
 - (vi) If a trust, the trustee of the trust;
 - (vii) If a religious or nonprofit organization, the individual in the senior leadership position within the organization.
 - (viii) If a school district, the superintendent of the district;
 - (ix) If an agency, the individual in the senior leadership position within the agency;or
 - (x) If a county, municipality, or other political subdivision of the state, the individual in the senior leadership position within the county, municipality, or political subdivision.

Approved means acceptable to the REGULATORY AUTHORITY or to the FOOD regulatory agency that has jurisdiction based on a determination of conformity with principles, practices, and generally recognized standards that protect public health.

AW means water activity which is a measure of the free moisture in a FOOD, is the quotient of the water vapor pressure of the substance divided by the vapor pressure of pure water at the same temperature, and is indicated by the symbol aw.

Beverage means a liquid for drinking, including water.

Bottled drinking water means water that is SEALED in bottles, packages, or other containers and offered for sale for human consumption, including bottled mineral water.

Certification number means a unique combination of letters and numbers assigned by a SHELLFISH CONTROL AUTHORITY to a MOLLUSCAN SHELLFISH dealer according to the provisions of the National Shellfish Sanitation Program.

CIP

(a) **CIP** means cleaned in place by the circulation or flowing by mechanical means through a piping system of a detergent solution, water rinse, and SANITIZING solution onto or over EQUIPMENT surfaces that require cleaning, such as the method used, in part, to clean and SANITIZE a frozen dessert machine.

(b) **CIP** does not include the cleaning of EQUIPMENT such as band saws, slicers, or mixers that are subjected to in-place manual cleaning without the use of a CIP system.

CFR means CODE OF FEDERAL REGULATIONS. Citations in this Code to the CFR refer sequentially to the Title, Part, and Section numbers, such as 21 CFR 178.1010 refers to Title 21, Part 178, Section 1010.

Code of Federal Regulations means the compilation of the general and permanent rules published in the Federal Register by the executive departments and agencies of the federal government which:

(a) Is published annually by the U.S. Government Printing Office; and

(b) Contains FDA rules in 21 CFR, USDA rules in 7 CFR and 9 CFR, EPA rules in 40 CFR, and Wildlife and Fisheries rules in 50 CFR.

Comminuted

(a) **Comminuted** means reduced in size by methods including chopping, flaking, grinding, or mincing.

(b) **Comminuted** includes FISH or MEAT products that are reduced in size and restructured or reformulated such as gefilte FISH, gyros, ground beef, and sausage; and a mixture of 2 or more types of MEAT that have been reduced in size and combined, such as sausages made from 2 or more MEATS.

Confirmed disease outbreak means a FOODBORNE DISEASE OUTBREAK in which laboratory analysis of appropriate specimens identifies a causative agent and epidemiological analysis implicates the FOOD as the source of the illness.

Consumer means a PERSON who is a member of the public, takes possession of FOOD, is not functioning in the capacity of an operator of a FOOD ESTABLISHMENT, and does not offer the FOOD for resale.

Corrosion-resistant material means a material that maintains acceptable surface cleanability characteristics under prolonged influence of the FOOD to be contacted, the normal use of cleaning compounds and SANITIZING solutions, and other conditions of the use environment.

Critical control point means a point or procedure in a specific FOOD system where loss of control may result in an unacceptable health risk.

Critical item

- (a) **Critical item** means a provision of this Code, that, if in noncompliance, is more likely than other violations to contribute to FOOD contamination, illness, or environmental health HAZARD.
- (b) **Critical item** is an item that is denoted in this Code with an asterisk *.

Critical limit means the maximum or minimum value to which a physical, biological, or chemical parameter must be controlled at a CRITICAL CONTROL POINT to minimize the risk that the identified FOOD safety HAZARD may occur.

- (a) **Department** means the Arizona Department of Health Services.

Drinking water

- (a) **Drinking water** means water that meets 40 CFR 141 National Primary Drinking Water Regulations.
- (b) **Drinking water** is traditionally known as “potable water.”
- (c) **Drinking water** includes the term “water” except where the term used connotes that the water is not potable, such as “boiler water,” “mop water,” “rainwater,” “wastewater,” and “nondrinking” water.

Dry storage area means a room or area designated for the storage of PACKAGED or containerized bulk FOOD that is not POTENTIALLY HAZARDOUS and dry goods such as SINGLE-SERVICE items.

Easily cleanable

- (a) **Easily cleanable** means a characteristic of a surface that:
 - (i) Allows effective removal of soil by normal cleaning methods;
 - (ii) Is dependent on the material, design, construction, and installation of the surface; and
 - (iii) Varies with the likelihood of the surface's role in introducing pathogenic or toxigenic agents or other contaminants into FOOD based on the surface's APPROVED placement, purpose, and use.
- (b) **Easily cleanable** includes a tiered application of the criteria that qualify the surface as EASILY CLEANABLE as specified under Subparagraph (a) of this definition to different situations in which varying degrees of cleanability are required such as:
 - (i) The appropriateness of stainless steel for a FOOD preparation surface as opposed to the lack of need for stainless steel to be used for floors or for tables used for CONSUMER dining; or
 - (ii) The need for a different degree of cleanability for a utilitarian attachment or accessory in the kitchen as opposed to a decorative attachment or accessory in the CONSUMER dining area.

Easily movable means:

- (a) Portable; mounted on casters, gliders, or rollers; or provided with a mechanical means to safely tilt a unit of EQUIPMENT for cleaning; and
- (b) Having no utility connection, a utility connection that disconnects quickly, or a flexible utility connection line of sufficient length to allow the EQUIPMENT to be moved for cleaning of the EQUIPMENT and adjacent area.

Employee means the LICENSE HOLDER, PERSON IN CHARGE, PERSON having supervisory or management duties, PERSON on the payroll, family member, volunteer, PERSON performing work under contractual agreement, or other PERSON working in a FOOD ESTABLISHMENT.

EPA means the U.S. Environmental Protection Agency.

Equipment

- (a) **Equipment** means an article that is used in the operation of a FOOD ESTABLISHMENT such as a freezer, grinder, hood, ice maker, MEAT block, mixer, oven, reach-in refrigerator, scale, sink, slicer, stove, table, TEMPERATURE MEASURING DEVICE for ambient air, VENDING MACHINE, or WAREWASHING machine.
- (b) **Equipment** does not include items used for handling or storing large quantities of PACKAGED FOODS that are received from a supplier in a cased or overwrapped lot, such as hand trucks, forklifts, dollies, pallets, racks, and skids.
- (c) **FC** means the United States Food and Drug Administration publication, Food Code: 1999 Recommendations of the United States Public Health Service, Food and Drug Administration (1999), as modified and incorporated by reference in A.A.C. R9-8-107.

Fish

- (a) **Fish** means fresh or saltwater finfish, crustaceans and other forms of aquatic life (including alligator, frog, aquatic turtle, jellyfish, sea cucumber, and sea urchin and the roe of such animals) other than birds or mammals, and all mollusks, if such animal life is intended for human consumption.
- (b) **Fish** includes an edible human FOOD product derived in whole or in part from FISH, including FISH that have been processed in any manner.

Food means a raw, cooked, or processed edible substance, ice, BEVERAGE, or ingredient used or intended for use or for sale in whole or in part for human consumption, or chewing gum.

Foodborne disease outbreak means the occurrence of two or more cases of a similar illness resulting from the ingestion of a common food.

Food-contact surface means:

- (a) A surface of EQUIPMENT or a UTENSIL with which FOOD normally comes into contact; or
- (b) A surface of EQUIPMENT or a UTENSIL from which FOOD may drain, drip, or splash:
 - (i) Into a FOOD, or
 - (ii) Onto a surface normally in contact with FOOD.

Food employee means an individual working with unPACKAGED FOOD, FOOD EQUIPMENT or UTENSILS, or FOOD-CONTACT SURFACES.

Food establishment

- (a) **Food establishment** means an operation that stores, prepares, packages, serves, vends, or otherwise provides FOOD for human consumption:
 - (i) Such as a restaurant; satellite or catered feeding location; catering operation if the operation provides FOOD directly to a CONSUMER or to a conveyance used to transport people; market; vending location; conveyance used to transport people; institution; or FOOD bank; and
 - (ii) That relinquishes possession of FOOD to a CONSUMER directly, or indirectly through a delivery service such as home delivery of grocery orders or restaurant takeout orders, or delivery service that is provided by common carriers.
- (b) **Food establishment** includes:
 - (i) An element of the operation such as a transportation vehicle or a central preparation facility that supplies a vending location or satellite feeding location *unless the vending or feeding location is PERMITTED by the REGULATORY AUTHORITY*; and
 - (ii) An operation that is conducted in a mobile, stationary, temporary, or permanent facility or location; where consumption is on or off the PREMISES; and regardless of whether there is a charge for the FOOD.
- (c) **Food establishment** does not include:
 - (i) An establishment that offers only prePACKAGED FOODS that are not POTENTIALLY HAZARDOUS;
 - (ii) A produce stand that only offers whole, uncut fresh fruits and vegetables;
 - (iii) A kitchen in a private home if only FOOD that is not POTENTIALLY HAZARDOUS is prepared for sale or service at a function such as a religious or charitable organization's bake sale if allowed by LAW and if the CONSUMER is informed by a clearly visible placard at the sales or service location that the FOOD is prepared in a kitchen that is not subject to regulation and inspection by the REGULATORY AUTHORITY;
 - (iv) An area where FOOD that is prepared as specified in Subparagraph (c)(iv) of this definition is sold or offered for human consumption;
 - (v) A kitchen in a private home, such as a small family day-care provider; or a bed-and-breakfast operation that prepares and offers FOOD to guests if the home is owner occupied, the number of available guest bedrooms does not exceed 6, breakfast is the only meal offered, the number of guests served does not exceed 18, and the CONSUMER is informed by statements contained in published advertisements, mailed brochures, and placards posted at the registration area that the FOOD is prepared in a kitchen that is not regulated and inspected by the REGULATORY AUTHORITY; or
 - (vi) A private home that receives catered or home-delivered FOOD.

Food processing plant

- (a) **Food processing plant** means a FOOD ESTABLISHMENT that manufactures, packages, labels, or stores FOOD for human consumption and does not provide FOOD directly to a CONSUMER.
- (b) **Food processing plant** does not include a FOOD ESTABLISHMENT as defined under Subparagraph 1-201.10(B)(31).

Game animal

- (a) **Game animal** means an animal, the products of which are FOOD, that is not classified as cattle, sheep, swine, goat, horse, mule, or other equine in 9 CFR Subchapter A - Mandatory Meat Inspection, Part 301, as Poultry in 9 CFR Subchapter C - Mandatory Poultry Products Inspection, Part 381, or as FISH as defined under Subparagraph 1-201.10(B)(26).
- (b) **Game animal** includes mammals such as reindeer, elk, deer, antelope, water buffalo, bison, rabbit, squirrel, opossum, raccoon, nutria, or muskrat, and nonaquatic reptiles such as land snakes.
- (c) **Game animal** does not include ratites such as ostrich, emu, and rhea.

General use pesticide means a pesticide that is not classified by EPA for restricted use as specified in 40 CFR 152.175.

Grade A standards means the requirements of the United States Public Health Service/FDA “Grade A Pasteurized Milk Ordinance” and “Grade A Condensed and Dry Milk Ordinance” with which certain fluid and dry milk and milk products comply.

Group residence

- (a) **Group residence** means a private or public housing corporation or institutional facility that provides living quarters and meals.
- (b) **Group residence** includes a domicile for unrelated PERSONS such as a retirement home or a long-term health care facility.

HACCP plan means a written document that delineates the formal procedures for following the HAZARD Analysis CRITICAL CONTROL POINT principles developed by The National Advisory Committee on Microbiological Criteria for Foods.

Hazard means a biological, chemical, or physical property that may cause an unacceptable CONSUMER health risk.

Hermetically sealed container means a container that is designed and intended to be secure against the entry of microorganisms and, in the case of low acid canned FOODS, to maintain the commercial sterility of its contents after processing.

Highly susceptible population means a group of PERSONS who are more likely than other populations to experience foodborne disease because they are immunocompromised or older adults and in a facility that provides health care or assisted living services, such as a hospital or nursing home; or preschool age children in a facility that provides custodial care, such as a day care center.

Incongruous means inconsistent with the inspection reports of other inspectors or the REGULATORY AUTHORITY as a whole because significantly more or fewer violations of individual CRITICAL ITEMS are documented.

Imminent health hazard means a significant threat or danger to health that is considered to exist when there is evidence sufficient to show that a product, practice, circumstance, or event creates a situation that requires immediate correction or cessation of operation to prevent injury based on:

- (i) The number of potential injuries, and
- (ii) The nature, severity, and duration of the anticipated injury.

Injected means manipulating a MEAT so that infectious or toxigenic microorganisms may be introduced from its surface to its interior through tenderizing with deep penetration or injecting the MEAT such as by processes which may be referred to as “injecting,” “pinning,” or “stitch pumping.”

Juice, when used in the context of FOOD safety, means the aqueous liquid expressed or extracted from one or more fruits or vegetables, pures of the edible portions of one or more fruits or vegetables, or any concentrate of such liquid or pure. This definition does not apply to standards of identity.

Kitchenware means FOOD preparation and storage UTENSILS.

Law means applicable local, state, and federal statutes, regulations, and ordinances.

Linens means fabric items such as cloth hampers, cloth napkins, table cloths, wiping cloths, and work garments including cloth gloves.

Meat means the flesh of animals used as FOOD including the dressed flesh of cattle, swine, sheep, or goats and other edible animals, except fish, poultry, and wild game animals as specified under Subparagraphs 3-201.17(A)(3) and (4).

mg/L means milligrams per liter, which is the metric equivalent of parts per million (ppm).

Molluscan shellfish means any edible species of fresh or frozen oysters, clams, mussels, and scallops or edible portions thereof, except when the scallop product consists only of the shucked adductor muscle.

Packaged

- (a) **Packaged** means bottled, canned, cartoned, securely bagged, or securely wrapped.
- (b) **Packaged** does not include a wrapper, carry-out box, or other nondurable container used to containerize FOOD with the purpose of facilitating FOOD protection during service and receipt of the FOOD by the CONSUMER.

License means the document issued by the REGULATORY AUTHORITY that authorizes a PERSON to operate a FOOD ESTABLISHMENT.

License holder means the entity that:

- (a) Is legally responsible for the operation of the FOOD ESTABLISHMENT such as the owner, the owner's agent, or other PERSON; and
- (b) Possesses a valid LICENSE to operate a FOOD ESTABLISHMENT.

Mechanical Vector means an insect that carries disease-causing microorganisms on their bodies.

National Sanitation Foundation - A private organization that certifies or classifies food equipment for sanitation.

Person means an association, a corporation, individual, partnership, other legal entity, government, or governmental subdivision or agency.

Person in charge means the individual present at a FOOD ESTABLISHMENT who is responsible for the operation at the time of inspection.

Personal care items

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- (a) **Personal care items** means items or substances that may be poisonous, toxic, or a source of contamination and are used to maintain or enhance a PERSON'S health, hygiene, or appearance.
 - (b) **Personal care items** include items such as medicines; first aid supplies; and other items such as cosmetics, and toiletries such as toothpaste and mouthwash.

pH means the symbol for the negative logarithm of the hydrogen ion concentration, which is a measure of the degree of acidity or alkalinity of a solution. Values between 0 and 7 indicate acidity and values between 7 and 14 indicate alkalinity. The value for pure distilled water is 7, which is considered neutral.

Physical facilities means the structure and interior surfaces of a FOOD ESTABLISHMENT including accessories such as soap and towel dispensers and attachments such as light fixtures and heating or air conditioning system vents.

Plumbing fixture means a receptacle or device that:

- (a) Is permanently or temporarily connected to the water distribution system of the PREMISES and demands a supply of water from the system; or
- (b) Discharges used water, waste materials, or SEWAGE directly or indirectly to the drainage system of the PREMISES.

Plumbing system means the water supply and distribution pipes; PLUMBING FIXTURES and traps; soil, waste, and vent pipes; sanitary and storm sewers and building drains, including their respective connections, devices, and appurtenances within the PREMISES; and water-treating EQUIPMENT.

Poisonous or toxic materials means substances that are not intended for ingestion and are included in 4 categories:

- (a) Cleaners and SANITIZERS, which include cleaning and SANITIZING agents and agents such as caustics, acids, drying agents, polishes, and other chemicals;
- (b) Pesticides, except SANITIZERS, which include substances such as insecticides and rodenticides;
- (c) Substances necessary for the operation and maintenance of the establishment such as nonfood grade lubricants and PERSONAL CARE ITEMS that may be deleterious to health; and
- (d) Substances that are not necessary for the operation and maintenance of the establishment and are on the PREMISES for retail sale, such as petroleum products and paints.

Potentially hazardous food

- (a) **Potentially hazardous food** means a FOOD that is natural or synthetic and that requires temperature control because it is in a form capable of supporting:
 - (i) The rapid and progressive growth of infectious or toxigenic microorganisms;
 - (ii) The growth and toxin production of *Clostridium botulinum*; or
 - (iii) In raw shell eggs, the growth of *Salmonella enteritidis*.
- (b) **Potentially hazardous food** includes an animal FOOD (a FOOD of animal origin) that is raw or heat-treated; a FOOD of plant origin that is heat-treated or consists of raw seed sprouts; cut melons; and garlic-in-oil mixtures that are not modified in a way that results in mixtures that do not support growth as specified under Subparagraph (a) of this definition.
- (c) **Potentially hazardous food** does not include:

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- (i) An air-cooled hard-boiled egg with shell intact;
 - (ii) A FOOD with an aw value of 0.85 or less;
 - (iii) A FOOD with a pH level of 4.6 or below when measured at 24oC (75oF);
 - (iv) A FOOD, in an unopened HERMETICALLY SEALED CONTAINER, that is commercially processed to achieve and maintain commercial sterility under conditions of nonrefrigerated storage and distribution;
 - (v) A FOOD for which laboratory evidence demonstrates that the rapid and progressive growth of infectious or toxigenic microorganisms or the growth of *S. Enteritidis* in eggs or *C. botulinum* can not occur, such as a FOOD that has an aw and a pH that are above the levels specified under Subparagraphs (c)(ii) and (iii) of this definition and that may contain a preservative, other barrier to the growth of microorganisms, or a combination of barriers that inhibit the growth of microorganisms; or
 - (vi) A FOOD that does not support the growth of microorganisms as specified under Subparagraph (a) of this definition even though the FOOD may contain an infectious or toxigenic microorganism or chemical or physical contaminant at a level sufficient to cause illness.

Poultry

(a) **Poultry** means:

- (i) Any domesticated bird (chickens, turkeys, ducks, geese, or guineas), whether live or dead, as defined in 9 CFR 381 Poultry Products Inspection Regulations; and
- (ii) Any migratory waterfowl, game bird, or squab such as pheasant, partridge, quail, grouse, or guineas, whether live or dead, as defined in 9 CFR 362 Voluntary Poultry Inspection Program.

(b) **Poultry** does not include ratites.

Premises means:

- (a) The physical facility, its contents, and the contiguous land or property under the control of the LICENSE HOLDER; or
- (b) The physical facility, its contents, and the land or property not described under Subparagraph (a) of this definition if its facilities and contents are under the control of the LICENSE HOLDER and may impact FOOD ESTABLISHMENT personnel, facilities, or operations, and a FOOD ESTABLISHMENT is only one component of a larger operation such as a health care facility, hotel, motel, school, recreational camp, or prison.

Prepare means to process commercially for human consumption by manufacturing, packaging, labeling, cooking, or assembling.

Primal cut means a basic major cut into which carcasses and sides of MEAT are separated, such as a beef round, pork loin, lamb flank, or veal breast.

Public health control means a method to prevent transmission of foodborne illness to the CONSUMER.

Public water system has the meaning stated in 40 CFR 141 National Primary Drinking Water Regulations.

Ready-to-eat food

- (a) **Ready-to-eat food** means FOOD that is in a form that is edible without washing, cooking, or additional preparation by the FOOD ESTABLISHMENT or the CONSUMER and that is reasonably expected to be consumed in that form.
- (b) **Ready-to-eat food** includes:
 - (i) POTENTIALLY HAZARDOUS FOOD that is unPACKAGED and cooked to the temperature and time required for the specific FOOD under Subpart 3-401;
 - (ii) Raw, washed, cut fruits and vegetables;
 - (iii) Whole, raw fruits and vegetables that are presented for consumption without the need for further washing, such as at a buffet; and
 - (iv) Other FOOD presented for consumption for which further washing or cooking is not required and from which rinds, peels, husks, or shells are removed.

Reduced oxygen packaging

- (a) **Reduced oxygen packaging** means:
 - (i) The reduction of the amount of oxygen in a PACKAGE by removing oxygen; displacing oxygen and replacing it with another gas or combination of gases; or otherwise controlling the oxygen content to a level below that normally found in the surrounding, 21% oxygen atmosphere, and
 - (ii) A process as specified in Subparagraph (a)(1) of this definition that involves a FOOD for which *Clostridium botulinum* is identified as a microbiological HAZARD in the final PACKAGED form.
- (b) **Reduced oxygen packaging** includes:
 - (i) Vacuum PACKAGING, in which air is removed from a PACKAGE of FOOD and the PACKAGE is HERMETICALLY SEALED so that a vacuum remains inside the PACKAGE, such as sous vide;
 - (ii) Modified atmosphere PACKAGING, in which the atmosphere of a PACKAGE of FOOD is modified so that its composition is different from air but the atmosphere may change over time due to the permeability of the PACKAGING material or the respiration of the FOOD. Modified atmosphere PACKAGING includes: reduction in the proportion of oxygen, total replacement of oxygen, or an increase in the proportion of other gases such as carbon dioxide or nitrogen; and
 - (iii) Controlled atmosphere PACKAGING, in which the atmosphere of a PACKAGE of FOOD is modified so that until the PACKAGE is opened, its composition is different from air, and continuous control of that atmosphere is maintained, such as by using oxygen scavengers or a combination of total replacement of oxygen, nonrespiring food, and impermeable packaging material.

Refuse means solid waste not carried by water through the SEWAGE system.

Regulatory authority means the Department or a local health department or public health services district operating under a delegation of authority from the Department.

Remodel means to change the PHYSICAL FACILITIES or PLUMBING FIXTURES in a FOOD ESTABLISHMENT'S FOOD preparation, storage, or cleaning areas through construction, replacement, or relocation, but does not include the replacement of old EQUIPMENT with new EQUIPMENT of the same type.

Requester means a PERSON who requests an approval from the REGULATORY AUTHORITY, but who is not an applicant or a LICENSE HOLDER.

Restricted use pesticide means a pesticide product that contains the active ingredients specified in 40 CFR 152.175 Pesticides classified for restricted use, and that is limited to use by or under the direct supervision of a certified applicator.

Safe material means:

- (a) An article manufactured from or composed of materials that may not reasonably be expected to result, directly or indirectly, in their becoming a component or otherwise affecting the characteristics of any FOOD;
- (b) An additive that is used as specified in § 409 or 706 of the Federal Food, Drug, and Cosmetic Act; or
- (c) Other materials that are not ADDITIVES and that are used in conformity with applicable regulations of the Food and Drug Administration.

Sanitization means the application of cumulative heat or chemicals on cleaned FOOD-CONTACT SURFACES that, when evaluated for efficacy, is sufficient to yield a reduction of 5 logs, which is equal to a 99.999% reduction, of representative disease microorganisms of public health importance.

Sealed means free of cracks or other openings that allow the entry or passage of moisture.

Service animal means an animal such as a guide dog, signal dog, or other animal individually trained to provide assistance to an individual with a disability.

Servicing area means an operating base location to which a mobile FOOD ESTABLISHMENT or transportation vehicle returns regularly for such things as vehicle and equipment cleaning, discharging liquid or solid wastes, refilling water tanks and ice bins, and boarding FOOD.

Sewage means liquid waste containing animal or vegetable matter in suspension or solution and may include liquids containing chemicals in solution.

Shellfish control authority means a state, federal, foreign, tribal, or other government entity legally responsible for administering a program that includes certification of MOLLUSCAN SHELLFISH harvesters and dealers for interstate commerce.

Shellstock means raw, in-shell MOLLUSCAN SHELLFISH.

Shucked shellfish means MOLLUSCAN SHELLFISH that have one or both shells removed.

Single-service articles means TABLEWARE, carry-out UTENSILS, and other items such as bags, containers, placemats, stirrers, straws, toothpicks, and wrappers that are designed and constructed for one time, one PERSON use after which they are intended for discard.

Single-use articles



(a) **Single-use articles** means UTENSILS and bulk FOOD containers designed and constructed to be used once and discarded.

(b) **Single-use articles** includes items such as wax paper, butcher paper, plastic wrap, formed aluminum FOOD containers, jars, plastic tubs or buckets, bread wrappers, pickle barrels, ketchup bottles, and number 10 cans which do not meet the materials, durability, strength, and cleanability specifications under §§ 4-101.11, 4-201.11, and 4-202.11 for multiuse UTENSILS.

Slacking means the process of moderating the temperature of a FOOD such as allowing a FOOD to gradually increase from a temperature of -23°C (-10°F) to -4° C (25°F) in preparation for deep-fat frying or to facilitate even heat penetration during the cooking of previously block-frozen FOOD such as spinach.

Smooth means:

(a) A FOOD-CONTACT SURFACE having a surface free of pits and inclusions with a cleanability equal to or exceeding that of (100 grit) number 3 stainless steel;

(b) A nonFOOD -CONTACT SURFACE of EQUIPMENT having a surface equal to that of commercial grade hot-rolled steel free of visible scale; and

(c) A floor, wall, or ceiling having an even or level surface with no roughness or projections that render it difficult to clean.

Table-mounted equipment means EQUIPMENT that is not portable and is designed to be mounted off the floor on a table, counter, or shelf.

Tableware means eating, drinking, and serving UTENSILS for table use such as flatware including forks, knives, and spoons; hollowware including bowls, cups, serving dishes, and tumblers; and plates.

Temperature measuring device means a thermometer, thermocouple, thermistor, or other device that indicates the temperature of FOOD, air, or water.

Temporary food establishment means a FOOD ESTABLISHMENT that operates for a period of no more than 14 consecutive days in conjunction with a single event or celebration.

USDA means the U.S. Department of Agriculture.

Utensil means a FOOD-contact implement or container used in the storage, preparation, transportation, dispensing, sale, or service of FOOD, such as KITCHENWARE or TABLEWARE that is multiuse, SINGLE-SERVICE, or SINGLE-USE; gloves used in contact with FOOD ; FOOD TEMPERATURE MEASURING DEVICES; and probe-type price or identification tags used in contact with FOOD.

Variance means a written document issued by the REGULATORY AUTHORITY that authorizes a modification or waiver of one or more requirements of this Code if, in the opinion of the REGULATORY AUTHORITY, a health HAZARD or nuisance will not result from the modification or waiver.

Vending machine means a self-service device that, upon insertion of a coin, paper currency, token, card,

or key, or by optional manual operation, dispenses unit servings of FOOD in bulk or in packages without the necessity of replenishing the device between each vending operation.

Vending machine location means the room, enclosure, space, or area where one or more VENDING MACHINES are installed and operated and includes the storage areas and areas on the PREMISES that are used to service and maintain the VENDING MACHINES.

Warewashing means the cleaning and SANITIZING of UTENSILS and FOOD-CONTACT SURFACES of EQUIPMENT.

Whole-muscle, intact beef means whole muscle beef that is not injected, mechanically tenderized, reconstructed, or scored and marinated, from which beef steaks may be cut.

Notes

DISEASES

Food & Water Borne Diseases

Bacteria

1. *Clostridium botulinum* - Botulism Poisoning
2. *Clostridium perfringens*
3. *Campylobacter jejuni* - Campylobacteriosis
4. *Vibrio cholerae* - Cholera
5. *Vibrio parahaemolyticus*
6. *Escherichia coli* 0157:H7 - Hemorrhagic colitis
7. *Listeria monocytogenes*
8. *Shigella* sp. - Shigellosis
9. *Salmonella* sp. - Salmonellosis
10. *Staphylococcus aureus* - Staph Food Poisoning

Viruses

1. Hepatitis A
2. Norovirus

Protozoa and Metazoa

1. *Giardia lamblia* - Giardiasis
2. *Cryptosporidium parvum* - Cryptosporidiosis
3. *Trichinella spiralis* - Trichinosis
4. *Taenia solium* - Taeniasis

Diseases

The last thing most people associate with a dining experience is the possibility of contracting a disease while enjoying their meal. However, the risk of illness is very real, and food managers and handlers need to be aware of diseases that may be present and how to prevent the spread of these diseases.

There are three primary Food Hazards: Biological, Physical and Chemical. Chemical food hazards are easily prevented by not exposing food to chemicals. By employing the following rules, chemical contamination may be avoided:

- Do not store chemicals over or next to food
- Do not store chemicals in food containers
- Do not store food in chemical containers
- Label all containers with the common chemical name

Physical hazards are also avoidable by maintaining equipment, by removing foreign matter by thoroughly washing produce, and by safely storing food to prevent contamination.

Biological hazards consist of microorganisms that are invisible to the naked eye and, therefore, must be controlled or managed by employing safe food handling techniques, which will be discussed in the following sections. The primary causes of food borne diseases include bacteria, viruses and parasites. Bacteria are capable of growing in potentially hazardous foods. Whereas; viruses are intracellular, obligate microbes, and parasites also obligate parasites and are incapable of growing and multiplying outside of a living host.

Disease may be defined as an abnormal condition of an organism or part, especially as a consequence of infection, inherent weakness, or environmental stress that impairs normal physiological functioning. Food Managers need to be concerned especially with infectious diseases that can be transmitted from humans to humans. Diseases may be transmitted to people from improperly handled food and water.

The following sections review common diseases associated with food, water, and wildlife. The discussion of each disease includes the cause, stages, prevention and control measures.

Food Borne & Water Borne Diseases

Disease-causing agents are not detectable in food. Food that is contaminated with pathogenic microorganisms and/ or their toxins may look, smell, and taste fine. This is one reason that there are so many food borne outbreaks each year in the United States.

In the United States the Centers for Diseases Control and Prevention estimates that about 76 million people become ill with food borne disease per year, resulting in about 5,000 deaths each year ⁽¹⁾. From 1997 to 1998 the



Centers for Disease Control and Prevention reported 4,166 illnesses from drinking water and recreational water exposure in the United States ⁽²⁾. Nevertheless, most food borne outbreaks go unreported because many food borne illnesses are self-limiting and few people who contract these diseases seek medical attention. However, groups that may be at a higher risk of becoming seriously ill from a food borne or water borne disease are the elderly, pre-school aged children, pregnant women and immunocompromised individuals.

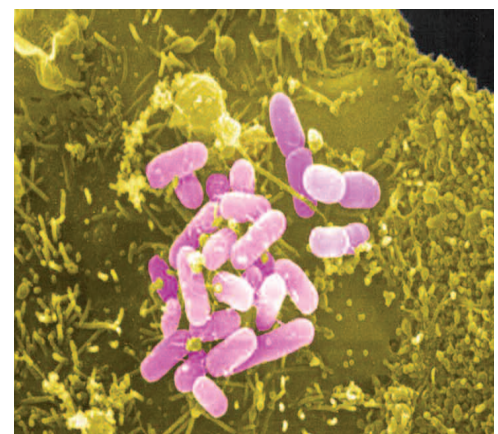
A food borne or water borne outbreak is defined by the Food and Drug Administration (FDA) as “an occurrence of two or more cases of similar illness resulting from the ingestion of a common food”. However, for certain diseases such as botulism poisoning, only one case is considered an outbreak and must be reported to a local health authority. When investigating a possible food borne disease outbreak, epidemiologists collect information about each individual’s food history, incubation period, signs and symptoms and duration. A food history is important since most food borne diseases take anywhere from several hours to days or even weeks before symptoms may occur. The incubation period is measured from the time contaminated food is consumed to the first signs and symptoms. All of this information assists an epidemiologist in determining what type of organism caused an outbreak. However, in order to identify the cause of a disease with certainty, samples of the incriminated food or water must be taken and analyzed along with stool or sputum samples from sick individuals.

Food borne diseases generally fall into one of three categories: infections, intoxications, or toxin-mediated infections. An infection occurs when a microbe grows and multiplies inside a host, whereas, an intoxication is characterized by the production of toxins in food that is consumed. A toxin-mediated infection develops when a microbe both infects and releases toxins inside a host. In most cases of food borne illness, the disease-causing agent or toxins primarily affect the epithelial lining of the digestive tract.

To prevent food and water borne diseases, backcountry users need to exercise discretion when deciding what types of food to take on a trip, and how food will be stored and prepared. Also, care must be taken when selecting a water purification device. In most cases, food borne and water borne diseases may be prevented by implementing simple water purification procedures and safe food handling methods. The following sections cover the most common water and food borne diseases and provide information about the stages of each disease, how it’s transmitted, common sources, and steps to prevent disease.

Bacteria

Bacteria are single - celled organisms that are capable of growing and reproducing without the aid of a host. A single bacterial cell is about one twenty-five thousandth of an inch in size, rendering it invisible to a human eye. Bacterial cells may be round, rod, or spiral-shaped. Some bacteria are capable of forming spores that protect them from extreme heat and cold conditions. After a bacterium forms, a spore it cannot grow or multiply, but once the environment changes and there is food, moisture and ideal temperatures, bacteria will come out of their spores and reproduce.



Rod-Shaped Bacteria

Bacteria multiply by a process called binary fission. Binary fission is asexual reproduction where one bacteria cell splits into two complete organisms. Pathogenic (capable of causing disease) bacteria grow and multiply very rapidly under the ideal conditions. For example, one pathogenic bacterial cell can multiply into 66 million cells within 24 hours in potentially hazardous food. Many of the bacterial food borne diseases discussed below only require 10 to 20 cells to cause disease in a single person.

Bacteria need the proper moisture, temperature, pH and food to grow and multiply. As indicated above, pathogenic bacteria can grow and multiply in potentially hazardous food. Potentially hazardous food is defined by the Food and Drug Administration as food that can support the growth of disease-causing bacteria. Food that is potentially hazardous has a pH greater than 4.6 and a water activity greater than 0.85. Typically, pH measures whether a substance is acidic or basic, and the water activity measures the percentage of moisture in food. Foods that meet these requirements include raw and cooked meat (fish, beef, pork, poultry, sheep, etc.), cooked vegetables, raw sprouts (bean, clover and alfalfa), any type of cut melons, cooked legumes, cooked grains, dairy products, chopped garlic in oil and whole fresh eggs.

Given that all of these foods can support the growth of pathogenic bacteria, they must be held at and cooked to proper temperatures to prevent disease.

Clostridium botulinum

Disease Agent

Botulism is food poisoning that is caused by a rod-shaped bacterium called *Clostridium botulinum*. This bacterium is a spore-former that produces a neurotoxin in the presence of low acid food under anaerobic conditions (devoid of oxygen), such as in canned vegetables and packaged meat products. *Clostridium botulinum* produces toxins A, B, E, F and G, but most outbreaks are due to toxins A, B, E and F. All of these toxins are heat liable, and may be destroyed by heat (boiling temperatures).

This bacterium also causes two other types of diseases, intestinal infant / adult botulism and wound botulism. Intestinal infant botulism is different from food borne botulism in that bacteria grow and produce a neurotoxin in the digestive tract of children under 12 months of age. In rare cases, intestinal botulism has been documented in adults where their natural intestinal flora was disrupted or killed off, allowing botulism bacteria to grow and multiply in place of the natural flora.

Wound botulism occurs when a wound is contaminated with *Clostridium botulinum* and a wound seals, thus, creating anaerobic conditions.

Reservoir/Source

Clostridium botulinum is worldwide and may be found in soil, sediment of lakes and ponds, and in the digestive tract of fish and other animals.

Occurrence/Transmission

Botulism neurotoxin is produced if low acid canned food, such as vegetables, meat and fish are improperly processed. Hermetically sealed packages and canned food also may become contaminated with the ubiquitous botulism spores if a can is damaged, especially on a seam.

Transmission is through ingestion of the preformed toxin in food. Only a few nanograms (one nanogram is one billionth of a gram) of the neurotoxin may cause an intoxication. Interestingly, the disease may not be spread from person to person.

Foods that have been associated with food borne botulism outbreaks in the United States include home canned vegetables and low acid fruits, dried whole fish (with viscera), sauteed onions, chopped garlic in oil, and baked potatoes.

Stages of Disease

The incubation period ranges from 12 to 36 hours. The shorter the incubation period, the more severe the disease and the higher the case fatality rate.

Once ingested, the neurotoxin causes flaccid paralysis that progresses symmetrically, starting from the eyes downward. The first signs and symptoms exhibited are blurred or double vision, vomiting and constipation or diarrhea, followed by a dry mouth, difficulty speaking and swallowing, and respiratory arrest.

The case fatality rate in the United States for botulism intoxication is 5 % to 10%. However, for those who survive intoxication recovery is a slow process and may take months.

Treatment

The treatment for botulism intoxication is administration of an antitoxin, which is provided by the Centers of Disease Control and Prevention, and respiratory support to prevent hypoxia (oxygen deficiency).

Prevention

Primary prevention consists of **not** consuming food from damaged or bulged hermetically sealed cans or packages. Backcountry operators cannot serve “home” canned or hermetically packaged food to guests because home processing is inconsistent and may fail to destroy all botulism spores, therefore increasing the risk of botulism poisoning. Hermetically processed food for guests must be from an approved commercial source, and in good physical condition. Canned or packaged low acid food, such as vegetables and meats, should be boiled prior to consumption as an extra precaution in case a container has physical damage that is invisible.

Other preventive methods include immediate chilling of baked potatoes and other cooked vegetables to 41°F within 4 hours to prevent bacteria like botulism from growing and producing their toxins. Also, opened packages and containers of low acid food must immediately be placed in an ice chest at 41°F or less to prevent bacterial growth.



Clostridium perfringens

Disease Agent

This bacterium is a spore-former that causes a toxin-mediated infection. The bacterium grows under anaerobic conditions in potentially hazardous food, and once consumed infects the digestive tract and elaborates an enterotoxin that results in a food borne illness.

Reservoir/Source

Clostridium perfringens is found in soil, sediment and in the intestinal tracts of healthy humans and other animals.

Occurrence/Transmission

This bacterium is widely distributed. It is one of the most commonly reported food borne diseases in the United States, and the Centers for Disease Control and Prevention estimates about 10,000 cases occur each year.

Food borne illness occurs from improper cooking practices. This bacterium rapidly grows in potentially hazardous food, such as meat, meat products and gravies.

Stages of Disease

To cause illness, there must be over 100,000 bacterial cells in food. Signs and symptoms usually begin 6 to 24 hours after the food is consumed and lasts for about one to two days. Typical symptoms are abdominal cramps, diarrhea, nausea, .Vomiting and fever usually are absent. Death is rare in healthy people.

Treatment

In most cases treatment is not required, but when it is rehydration and replacement of electrolytes are administered.

Prevention

The primary technique used for prevention of this food borne disease is the proper cooling and reheating of potentially hazardous food, since bacterial spores survive cooking temperatures. To cool food properly, hot food must be placed in shallow containers in small quantities so the food is no greater than two inches deep. Hot food must be placed in a cooler immediately so it will cool to 41°F within 4 hours. However, on a backcountry trip cooling food may not be possible, and should be avoided.

Additional preventive steps include rapidly reheating food to 165°F before it is served hot, and not holding food in a cooler at 41°F for longer than 4 days. The latter precaution is necessary because bacteria can grow and multiply at 41°F, and after four days bacterial numbers may be great enough to cause a food borne outbreak.



Campylobacter jejuni

Disease Agent

This is an acute zoonotic disease called Campylobacteriosis, which is caused by a curved-shaped rod bacterium. This disease is a toxin-mediated infection. *Campylobacter jejuni* produces a heat-labile toxin in the digestive tract lining after 400 to 500 bacterial cells are ingested. This disease is the leading cause of diarrhea in the United States, resulting in approximately 4 to 6 million cases each year.

Reservoir/Source

Animals that commonly carry this disease include healthy cattle, chickens, birds, puppies, kittens, swine, sheep, rodents and flies. While the animals carry the organism in their digestive tracts, flies are mechanical vectors. Mechanical vectors carry microorganisms externally on their bodies. A fly can spread the disease by picking up microbial “hitch hikers, on their legs and mouth parts and deposited these organisms on food and water. Other sources of this disease include untreated drinking water, such as water from springs, streams, rivers and lakes, and raw dairy products.

Occurrence/Transmission

Campylobacter jejuni occurs everywhere in the world. In fact, this bacterium is the cause of 5% to 14% of all cases of diarrhea worldwide, especially in children 2 years and younger.

Stages of Disease

The incubation period for this disease is 2 to 5 days, and the symptoms last anywhere from 2 to 10 days. Typical signs and symptoms include watery or sticky diarrhea (which can contain blood), fever, abdominal pain, nausea, headache and muscle pain. The period of communicability (when the disease may be spread from feces) is the entire duration of the disease, but some infections may be asymptomatic. Complications and relapses of this disease are infrequent, and the case fatality rate is one in a 1000.

Treatment

Antibiotic treatment usually is not necessary and most individuals are treated with fluids for rehydration and replacement of lost electrolytes.

Prevention

It is thought that most of the illnesses are caused by the consumption of undercooked poultry. Surveys indicate that 20% to 100% of commercial chickens are contaminated with *Campylobacter*. To prevent this disease, all poultry must be cooked throughout to at least 165°F for 15 seconds to kill this bacterium. It is equally important to sanitize all food contact surfaces after preparation of poultry to prevent cross-contamination to other food.

Good hygienic practices prevent the spread of communicable diseases, such as *Campylobacter*. After handling poultry and poultry products, hands need to be lathered with soap and washed for 20 seconds in 110°F water to remove gross debris and microorganisms.

Vibrio cholerae

Disease Agent

The disease Cholera is a bacterial infection. Cholera is caused by several different bacterial groups, which vary in virulence; that is, some cause more severe disease than others. All groups that cause this disease produce an enterotoxin in the lining of the digestive tract. It takes about one million bacterial cells to cause disease in an individual.

Reservoir/Source

Humans are the primary reservoir for this disease; however, “environmental” reservoirs have been identified in association with marine crustaceans including lobsters, shrimps, crabs and barnacles. In the United States, the coast of the Gulf of Mexico has been identified as an environmental reservoir for this organism.

Occurrence/Transmission

Cholera spread from India around the world during the 19th Century. Transmission is through the ingestion of food or water contaminated with feces or vomitus. While the last outbreaks of Cholera occurred in the United States around 1911, there has been a steady increase in the number of isolated cases in this country during recent years. This phenomenon has been attributed to worldwide travel. Most of these cases have involved bottled water, ice, ice cream, cooked rice, produce and raw or undercooked seafood from polluted waters.

Stages of Disease

Symptoms usually appear within 2 to 3 days after consumption of contaminated food or water. This disease is characterized by the sudden onset of profuse, painless, watery diarrhea (“rice water” stools), nausea and vomiting. This rapid onset of painless watery diarrhea results in rapid dehydration, which may lead to renal failure in severe, untreated cases. The case fatality rate for this disease may exceed 50% if the severe disease goes untreated, and is less than 1% if individuals receive proper treatment immediately.

Individuals are communicable when they are exhibiting signs and symptoms, but some individuals may remain communicable several months after they recover. Meaning someone who appears healthy is shedding cholera organisms from their feces, which can be transmitted to other people through food or water if this person does not practice good hygienic practices.

Treatment

The mainstays for the treatment of Cholera are aggressive rehydration, electrolyte replacement, and treatment of secondary complications from the disease. Anti-microbial treatment also is used as a supplemental treatment to reduce the numbers of bacteria in the digestive tract, and to shorten the period of communicability.

Prevention

The best prevention is to obtain water from approved sources and properly treat any surface water so pathogens are effectively removed. Cholera is primarily associated with poor sanitation, where human sewage contaminates drinking water and coastal waters. Seafood such as fish and shellfish also is a source, especially if the seafood is eaten raw or undercooked. All seafood served by commercial operators must be obtained from an approved source, and the Shucker-Packer Interstate Certificate Number must be obtained and kept for at least 90 days for all shellfish. However, “High Risk” individuals may not be

served undercooked seafood because of the increased risk of infection and complications. Raw or undercooked seafood must never be served to “High Risk” customers. However, if guests are not designated as “High Risk”, then raw or undercooked seafood may be prepared and served to them as long as they have been advised of the hazards.

Vibrio parahaemolyticus

Disease Agent

This bacterium causes enteritis that is less severe than *Vibrio cholerae*. The disease is self-limiting in that symptoms usually are mild in healthy individuals. It produces an enterotoxin in the digestive tract similar to Cholera. The infective dose is more than a million bacterial cells.

Reservoir/Source

Like Cholera, this bacterium also is found in marine coastal environments (in the water during warmer months and in the sediment during colder months).

Occurrence/Transmission

This organism is more widespread in the United States than Cholera, and outbreaks involve raw or undercooked seafood.

Stages of Disease

Within 12 to 24 hours after consumption of contaminated food or water, symptoms begin with watery diarrhea, abdominal cramps, and sometimes nausea, vomiting, fever and headache. Occasionally, symptoms include bloody or mucoid stools, high fever and high white blood cell count.

The disease is usually very self-limiting and recovery occurs within one to seven days. Death rarely occurs.

Unlike Cholera, this disease is not communicable (not spread from person to person).

Treatment

If treatment is required, it consists of rehydration and replacement of lost electrolytes.

Prevention

Properly store and cook marine fish and shellfish. Seafood must be stored cold at 41°F or less and cooked thoroughly to 145°F or greater for 15 seconds if the seafood is whole and intact. However, if the seafood is ground, it must be cooked to 155°F or greater for 15 seconds, and if the seafood is stuffed it must be cooked to 165°F or greater for 15 seconds.

Care must be taken to prevent cross-contamination when handling raw seafood. Do not store raw seafood immediately over or next to ready-to-eat food. Wash and sanitize all surfaces after preparing raw seafood and thoroughly wash hands after preparation.

If shellfish is brought on a backcountry trip, remember that the Shucker-Packer Interstate Certificate Number (SPICN) must be retained on file for at least 90 days after the shellfish are purchased. This number indicates where and when shellfish were harvested, information that will become critical if there is an outbreak from shellfish.

Raw or undercooked seafood cannot be served to “High Risk” customers. However, if guests are not designated as “High Risk”, then raw or undercooked seafood may be prepared and served to them as long as they have been advised of the hazards.

Escherichia coli 0157:H7

Disease Agent

The disease is known as hemorrhagic colitis and is caused by an enterohemorrhagic bacterial strain. This disease was first recognized in the United States in 1982. *Escherichia coli* 0157:H7 bacteria elaborate toxins in the digestive tract called cytotoxins. Production of the toxins depends on the presence of certain phage (viruses that infect bacteria), which are carried by the bacteria. Phage are viruses that infect bacteria cells. It takes anywhere from 10 to 15 bacterial cells to cause disease in an individual.

Reservoir/Source

Cattle are the most important host, and humans may serve as a reservoir for human to human transmission. In addition, there is increasing evidence that North American deer also may serve as a reservoir.

Occurrence/Transmission

In North America, *Escherichia coli* 0157:H7 is the main type of enterohemorrhagic strain. Disease occurs primarily from ingestion of undercooked beef patties, unpasteurized milk, unpasteurized apple cider, contaminated alfalfa sprouts and person to person transmission. Cases have been reported from contaminated drinking water sources and from swimming in a contaminated lake.

Stages of Disease

The incubation period range is from 2 to 8 days, and infected individuals are communicable for one week or less. However, one third of children may remain communicable for up to 3 weeks. The signs and symptoms of the disease include severe abdominal cramps, diarrhea (which initially watery but becomes grossly bloody), and occasionally vomiting. Fever is either low-grade or absent.

The disease may be mild (with watery diarrhea) or develop into a more severe form of the disease called Hemolytic Uremic Syndrome (HUS). About 2% to 7% of all patients develop HUS. However, for the less severe form of the disease recovery occurs in about 8 days.

Treatment

Treatment consists primarily of fluid and electrolyte replacement.

Prevention

The primary foods of concern are ground beef, unpasteurized milk and juice and alfalfa sprouts. To prevent illness from ground meat, all ground meat such as beef must be cooked throughout to 155°F or greater for 15 seconds. Care must also be taken to prevent cross-contamination during preparation, storage and transportation.

Only pasteurized dairy products and juice may be served to backcountry guests, and alfalfa sprouts must be thoroughly washed to remove debris and microbes.

If undercooked ground meat is prepared and served to guests, then they must be advised of the potential hazards, as outlined in the Consumer Advisory portion of the Food Section. However, if a backcountry group is a “high risk” group, then an operator may not serve them undercooked ground meat, alfalfa sprouts or un-pasteurized juice or milk.

Listeria monocytogenes

Disease Agent

It is a gram positive rod-shaped bacterium that has hair-like appendages, which allows movement. This bacterium is very hardy and cold-loving that allows it to survive freezing temperatures. An infective dose is estimated at 1,000 or fewer bacterial cells.

Reservoir Source

Studies indicate that 1 to 10% of humans may carry this bacterium, and it has been found in many other mammal species, birds, fish, shellfish, soil, water and silage.

Occurrence/Transmission

This disease occurs worldwide. Infections have been associated with the consumption of raw dairy products, contaminated pasteurized dairy products, raw vegetables, contaminated processed meats, raw meats, and improperly smoked fish. The organism may be transmitted from an infected mother to her fetus.

Stages of Disease

Listeriosis is the name of the disease caused by *Listeria monocytogenes*. The incubation period range is from 3 to 70 days with an average time of 24 days. The signs and symptoms of the initial stages of infection include nausea, vomiting, diarrhea, and fever. However, the disease may progress to septicemia, meningitis and encephalitis. In pregnant women, the organism may infect the fetus and cause abortion. The case fatality rates for adults may be as high as 35%. Diagnosis is confirmed from blood, cerebral spinal fluid or stool. Infected individuals may remain communicable for several months after the symptoms subside. Vaginal fluids from pregnant women are infectious.

Treatment

Treatment usually requires hospitalization and administration of antibiotics.

Prevention

Prevention includes the following:

- Proper cooking of poultry to 165°F for 15 seconds
- Proper cooking of whole fish or whole beef steaks to 145°F for 15 seconds
- Proper cooking of ground meat including beef or fish to 155°F for 15 seconds
- Avoid raw (non-pasteurized) dairy products
- Wash all produce thoroughly
- Pregnant women and immunocompromised individuals should avoid the consumption of undercooked or raw meats and non-pasteurized dairy products

Shigella

Disease Agent

There are four different species of *Shigella* that cause the disease named Shigellosis. These species are *sonnei*, *flexneri*, *boydii* and *dysenteriae*. *Shigella* bacteria are non-spore forming rod-shaped bacteria that infect the digestive tract of mainly humans, and in some infections produce an enterotoxin that may damage the intestinal lining.

Reservoir/Source

Humans are the primary source of *Shigella*, with primates occasionally acting as carriers.

Occurrence/Transmission

This disease is responsible for about 600,000 deaths per year worldwide. Most of the deaths involve children 10 years or younger. In the United States Shigellosis accounts for up to 300,000 diarrheal cases per year, and the case fatality rate is a function of the health of an individual. The case fatality rate can be as high as 20% among high risk groups, such as hospitalized patients.

Transmission primarily is via the fecal/oral route. Most cases are due to poor hygienic practices, especially the lack of or poor hand washing methods, and water contaminated with human feces.

Stages of Disease

The signs and symptoms of the disease begin anywhere from 12 to 96 hours after consuming as few as 10 to 100 bacterial cells. The symptoms include fever, nausea, vomiting, abdominal cramps and watery or bloody diarrhea. The disease is usually self-limiting for healthy individuals and recovery occurs anywhere from 4 to 7 days.

Treatment

For most cases, only fluid and electrolyte replacement is needed. However, for high risk individuals antimicrobial treatment may be used.

Prevention

To prevent the spread of diseases such as Shigellosis, great care must be taken to wash hands. The following hand washing procedure must be used before preparing food, before purifying water, after toilet duty, or after handling waste:

- Wash exposed hands, wrists and arms for 20 seconds in
- Warm water (~ 110°F) with
- Soap all exposed areas to a lather, then
- Rinse soap off and
- Air dry or dry with a paper towel

Salmonella

Disease Agent

These disease agents are non-motile, non-spore forming rod-shaped bacteria that cause the disease known as Salmonellosis. There are more than 2000 different serotypes of Salmonella, but there are only two species and they are *Salmonella typhi* (that has been changed recently to *S. enterica*) and *S. bongori*. However, all human pathogens are included within subspecies of *Salmonella enterica*. There is evidence that these bacteria produce an enterotoxin when embedded in the intestinal lining that may contribute to disease symptoms.

Reservoir/Source

Animals that are common carriers of the disease include poultry and swine, but also may include cattle, rodents, iguanas, turtles, tortoises, terrapins, dogs, cats and humans.

Stages of Disease

Symptoms usually occur with sudden onset of headache, fever, abdominal cramps, diarrhea, nausea and sometimes vomiting. Most infections with this organism result in inflammation of the intestines, but in some cases the infection may develop into septicemia or localize in any body tissue. Deaths with this disease are uncommon, however, death may be more frequent with high risk groups, such as young children, the elderly, or immunocompromised individuals.

For infection, at least 100 to 1000 organisms are needed, but as few as 15 to 20 cells may cause disease in high-risk individuals. Infected individuals are communicable throughout the acute phases of the disease. However, some may develop into a “carrier” state where no signs and symptoms are exhibited, but the organism still is present in the digestive tract. Normally the acute carrier-state only persists for several months, but in rare cases it may last up to a year or longer.

Occurrence/Transmission

The disease Salmonellosis occurs worldwide, and it is estimated that there are 5 million cases per year in the United States. The majority of the cases result from contaminated food and water, improperly cooked poultry and poultry products, improperly cooked eggs and egg products, improperly pasteurized milk and milk products, improperly sanitized kitchen surfaces and fecal/oral transmission due to improper hand washing.

Treatment

Most cases only require fluid and electrolyte replacement, but antibiotic treatment may be used on high-risk individuals.

Prevention

To prevent disease: wash hands thoroughly before handling or preparing food; sanitize kitchen surfaces; do not store raw poultry or poultry products next to or over other food; cook eggs and egg products to 145°F for 15 seconds; cook poultry and poultry products to 165°F for 15 seconds; use pasteurized milk and milk products; and store potentially hazardous food at 41°F or less.

Insects such as flies may also be a source of disease by mechanically transporting disease-causing organisms from feces to food and water. Therefore, toilet facilities must be properly covered when they are not being used to keep flies from accessing the waste.

Staphylococcus aureus

Disease Agent

Staphylococcus aureus is a circular-shaped, non-spore forming bacterium that causes Staphylococcus food poisoning. These bacteria elaborate a heat stable enterotoxin as they grow and multiply in food. It is this heat stable toxin that causes the symptoms of the illness. The heat stable toxin once produced in food cannot be destroyed by re-heating or cooking.

Reservoir/Source

Approximately 25% to 35% of the population carries this organism in the naso-pharyngeal area, on hair and on skin of the face and hands. Dairy cattle (especially with infected udders), dogs, and fowl also may serve as hosts for this organism.

Occurrence/Transmission

Staphylococcal food poisoning is one of the principle food borne diseases reported in the United States. Disease occurs when 1.0 micrograms of the toxin is consumed in food. A carrier introduces the organism to food, and if the food is held at improper temperatures, then bacteria produce the heat stable toxin. The toxin cannot be detected in food by smell, taste or sight. Fortunately, this disease cannot be transmitted from human to human.

Foods that this organism commonly grows on include sandwiches, lunch meat, salami, cooked ham, salad dressings, pastries and custards.

Stages of Disease

The incubation period ranges from 30 minutes to 8 hours. Food poisoning caused by this organism is characterized by abrupt onset with severe nausea, cramps, vomiting and diarrhea. The intoxication lasts anywhere from one to two days, and deaths are rare.

Treatment

Patients are treated with fluids and electrolyte replacement.

Prevention

Education of food handlers is a primary prevention for this disease. Food handlers must do the following:

- A strict hand washing regiment
- Avoid bare hand contact with ready to eat foods
- Hold food at proper cold temperature, and
- Hold food at proper hot temperature

However, the use of leftovers by outdoor operations is prohibited because of the increased risk of Staphylococcal food poisoning. Also, food servers with lesions on their hands, wrists, upper arms, or face need to be restricted and/or excluded from preparing food.

Viruses

Viruses are **not** single-celled creatures. In fact, viruses are not considered living organisms, since they are unable to grow and multiply without the aid of a living cell. The basic structure of a virus consists of a protein outer coating with a single piece of genetic material inside this coating, and a tail (Figure A). Viruses are the smallest of all microbes, ranging in size from 27 to 100 nanometers (one nanometer is one billionth of a meter).

Viruses are intracellular infectious agents. They infect a host by attaching to a cell, dissolving a small section of the cell wall and invading the cell through this opening (Figure B). The virus' single strand of genetic material then acts like a computer programmer and programs the host's cell to make more viruses. The cell eventually becomes filled with viruses and the cell explodes (lyses), which allows the new viruses to invade other cells. Because all viral diseases are intracellular infections, antibiotics cannot successfully treat viral diseases, since host cells would have to be destroyed in order to destroy the invading viruses.

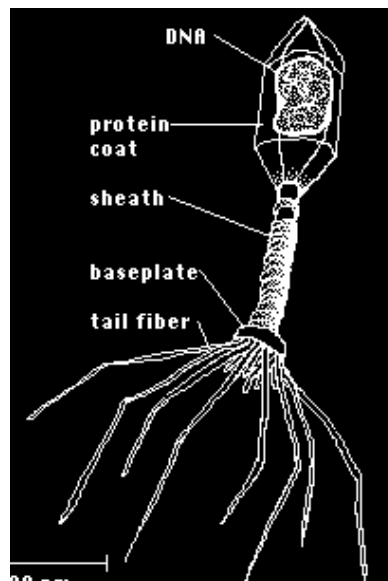


Figure A

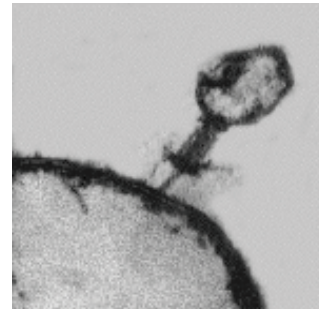


Figure B

Hepatitis A

Disease Agent

The Hepatitis A virus is an enterovirus that is part of the Picornaviridae family of viruses. This virus contains a single strand of RNA (ribonucleic acid) surrounded by a protein capsid and is about 27 nanometers in size. Hepatitis A causes the disease known as Infectious Hepatitis, which is transmitted by the fecal/oral route, that infects the liver.

Reservoir/Source

Humans are the primary source of Infectious Hepatitis, with chimpanzees acting as a source in rare instances.

Occurrence/Transmission

Hepatitis A occurs worldwide, with about 22,700 cases reported annually in the United States. Transmission mainly is through the fecal/oral route and contamination of food and water. This is why poor sanitation and over crowded conditions may lead to outbreaks of this disease. Other practices commonly associated with this disease are poor hygienic practices, improper food handling and poor diaper changing practices at day care facilities.

Stages of Disease

After an incubation period ranging from 15 to 50 days, onset is usually abrupt, with fever, overall discomfort, loss of appetite, nausea, and abdominal discomfort followed by jaundice (skin turns a yellow color). Only 10 to 100 viral particles are required to cause disease in a person. Most cases resolve within 1 to 2 weeks; however, about 15% of cases can take months to recover. There are a few cases where Hepatitis A may relapse for up to a year. Rarely do people die from this disease, but for compromised individuals it may be fatal.

People are highly communicable one to two weeks before onset of symptoms and may continue to shed the virus in their feces up to one week after jaundice.

Outbreaks have been documented at day care facilities, (especially where pre-school children are cared for) mainly because of improper diaper changing procedures. Many young children are asymptomatic, exhibiting only mild symptoms or no signs and symptoms of the disease. Therefore, the disease often may go unnoticed. If day care workers do not take great care when changing diapers and employ good hand washing techniques, then the risk of an outbreak is greatly increased.

Treatment

Contacts must receive passive immunization with immunoglobulin within 2 weeks. However, after symptoms begin there is no specific treatment, just supportive care.

Prevention

Good sanitation practices are crucial for prevention as well as education for food handlers and day care operators. It also is essential to properly treat raw water sources prior to consumption; take care during toilet handling, transportation and clean up; employ proper hand wash procedures; cook shellfish to 145°F for 15 seconds and retain the Shucker-Packer Interstate certificate number from the shellfish case for 90 days. However, if raw or undercooked shellfish is served to guests, then backcountry operators must provide a consumer advisory. If the backcountry operator is catering for an identified “high” risk group or individual, then raw or undercooked shellfish may not be served.

Hepatitis A vaccine (2 doses) is recommended for persons at high risk for contracting hepatitis A virus, such as children who live in areas that have a high incidence, or individuals who work around human feces.

Norovirus Virus

Disease Agent

The disease-causing agent is from a family of viruses that are classified as caliciviruses, each containing a single strand of RNA and are about 27 to 32 nanometers in size.

Reservoir/Source

Humans constitute the only known reservoir for this disease.

Occurrence/Transmission

This disease has been identified as the most common cause of non-bacterial gastroenteritis outbreaks in the United States. In the United States most outbreaks are linked to the consumption of raw or undercooked shellfish. Other outbreaks have been associated with fecal contamination of food, drinking water, and recreational water. The disease is transmitted by the fecal/oral route and viral particles may become airborne from someone vomiting. Viral particles may remain viable on surfaces, such as door knobs, faucet handles, and food equipment handles for up to 56 days. The period of communicability occurs during the acute stage of the disease and may last up to 10 days after diarrhea and vomiting ends. Norovirus can survive temperatures up to 140 degrees Fahrenheit and temperatures well below freezing. The virus is resistant to chlorine concentrations up to 5,000ppm.

Stages of Disease

Normally a self-limiting, mild disease that begins after 10 to 50 hours with nausea, vomiting, diarrhea, abdominal pain, muscle aches, headache, overall discomfort and a low grade fever. The symptoms usually last 24 to 48 hours and death from this disease is rare. About 30% of those exposed to norovirus do not exhibit any signs or symptoms, but they may be communicable up to 10 days.

Treatment

There is no specific treatment prescribed for this disease, just supportive care that includes fluid and electrolyte replacement.

Prevention

Prevention guidelines are the same as for Hepatitis A, and they include:

- Good hand wash practices during food preparation
- No bare hand contact with ready-to-eat foods
- Proper handling of toilet waste
- Adequate cooking of shellfish to 145°F for 15 seconds (If shellfish is served undercooked or raw then a consumer advisory must be given to guests, however, if guests are “high” risk then all shellfish must be adequately cooked)
- Proper treatment of drinking water
- Proper sanitizing of kitchen and equipment surfaces
- Proper storage of raw shellfish to prevent cross-contamination to other food

Protozoa and Metazoa

Protozoa are microscopic single-celled organisms, which have a more complex cellular structure than bacteria and range in size from 2 microns to 1/10th of a millimeter (just visible to the naked eye). Metazoa are multicellular parasites and some are very large and, therefore, visible to the human eye. Metazoa parasites include tapeworms, roundworms and flukes(5).

Some protozoa have become the main concern with regard to public and recreational water safety. Both *Giardia* and *Cryptosporidium* are leading causes of water borne disease in the United States. Protozoa can be found in all types of environments, and are capable of surviving extreme conditions like the North Pole and in hot springs. This is because protozoa like *Giardia* and *Cryptosporidium* produce cysts that protect them from extreme environmental conditions. These cysts can even endure normal concentrations of disinfectants, which is why raw water must be filtered.

Both protozoa and metazoa have pathogens that can invade a human host. Many of these pathogens are able to escape the human immune system, thus, causing an infection that may persist for a long time.

Giardia

Disease Agent

The disease agent is a protozoan parasite that has been identified as the most commonly reported pathogen in water borne disease outbreaks in the United States since 1971. The disease causing agents that can infect humans include *Giardia lamblia*, *Giardia duodenalis* and *Giardia intestinalis*. *Giardia* has two forms; the cyst is the infective stage that is excreted in feces, and the trophozoite is the stage that lives and multiplies in the small intestine of humans. Trophozoites may cause malabsorption of fats and fat-soluble vitamins during the infection. The infective form of *Giardia*, also known as a cyst, is resistant to cold temperatures and normal concentrations of disinfectants used to treat water. Therefore, to ensure that cysts are removed from “raw” water, water must be filtered to physically remove the hardy cysts. Cysts are ovoid in shape and are typically 7 to 10 micrometers wide and 10 to 15 micrometers long.

Reservoir/Source

Humans, as well as other animals such as rats, mice, dogs, cats, beavers, muskrats, gerbils, and mule deer may carry *Giardia* that may infect humans. However, beavers and muskrats are the most likely source for human infections.

Feces from humans and these other animals increase the prevalence of Giardiasis if untreated, unfiltered water is consumed from surface water sources like streams, lakes or rivers.

Occurrence/Transmission

Giardia is transmitted via the fecal/oral route through water and food, and the disease frequently is spread from person to person as well. *Giardia* sometimes is referred to “travelers” disease. Large water borne outbreaks have occurred, and illness has been associated with consumption of water from unfiltered surface water sources or shallow wells, and during water recreational activities. Giardiasis is the most commonly reported intestinal protozoan worldwide, and the World Health Organization estimates 200 million people are infected each year.

The disease is more prevalent in young children and infants, but anyone can get the disease if they consume contaminated food or water. The prevalence of human infection is 2% to 5% in industrialized countries like the United States.

Stages of Disease

Between 50% to 70% of infected individuals are asymptomatic, but still can spread the disease. However, people who manifest symptoms may experience chronic diarrhea, abdominal cramps, bloating, excess gas, pale greasy and foul smelling stools and weight loss. In severe cases the cells of the intestinal lining may become damaged, but in most cases the disease is self-limiting unless individuals are immunocompromised. Fortunately, deaths due to Giardiasis are rare.

It takes one or more cysts to cause infection, with a median incubation period of 7 to 10 days. Duration of the disease varies from 3 to 4 days, or months depending on the health of the infected individual, but most recover in 1 to 4 weeks without complications. However, some cases become chronic, and are characterized with recurrent, persistent brief episodes of loose foul-smelling stools that can last for months without treatment. The Giardia organisms may be spread throughout the entire duration of infection, with or without symptoms. This is probably why the disease is widespread, since many infected individuals do not realize they are infected and may easily spread the disease if they do not practice good hygiene.

Treatment

Adults who have Giardiasis commonly are treated with metronidazole, however, quinacrine and albendazole may be used as alternatives. Young children and infants are treated with furazolidine, which is available in pediatric suspensions.

Prevention

Giardia may be present in any surface water source and, therefore, it is critical that these sources be properly disinfected and filtered to remove cysts. It is equally important to properly handle, transport and dispose of human feces during a backcountry trip. All toilet units and equipment must be stored in tightly sealed containers and properly disinfected during a trip. Also, backcountry operators must implement proper hand wash procedures during a trip to prevent the spread of diseases like Giardiasis after using and handling portable toilets and equipment.

Cryptosporidium

Disease Agent

Cryptosporidium parvum, a protozoan parasite, is the primary disease-causing agent for humans. This protozoan has a complex life cycle that includes an oocyst and several other stages of development inside a host. Oocysts are small and oval, and are about 4 to 6 micrometers in size.

These oocysts are extremely resistant to environmental conditions, especially in cold water temperatures, and to normal concentrations of water disinfectants like chlorine and iodine. Symptoms of the disease are caused by the disruption of intestinal absorption and secretion by the protozoan parasite.

Reservoir/Source

Humans as well as other animals including cattle, sheep, pigs, goats, deer and horses are common reservoirs. These reservoirs contribute to environmental contamination of watersheds, foods and recreational waters.

Occurrence/Transmission

Cryptosporidium is widespread in surface waters and is common worldwide. It is estimated that there are over one million cases annually throughout the world. Numerous water borne outbreaks have occurred in the United States, most notably in Milwaukee, Wisconsin where over 400,000 people became infected in 1993 from improperly filtered surface water.

Transmission is person to person, or animal to person by the fecal/oral route. However, transmission may occur when human and/or animal feces contaminate food and water sources.

Stages of Disease

An infective dose ranges from 30 to a million oocysts, depending on the individual. Symptoms of the disease occur between a mean of 7 to 9 days after oocysts are consumed. Signs primarily include profuse watery diarrhea that resolves itself in less than 30 days. However, other symptoms may include fever, anorexia, nausea, abdominal cramps, vomiting, or infection of the respiratory tract. Illness may persist and contribute to death in individuals that have weakened immune systems.

Treatment

Currently, there is no treatment for Cryptosporidium other than fluid and electrolyte replacement.

Prevention

Primary prevention includes:

- Proper handling, transportation and disposal of human feces.
- Proper disinfection and filtration of water sources.
- Good personal hygiene for backcountry operators.

Trichinella spiralis

Disease Agent

The disease Trichinellosis is caused by a metazoan, which is a roundworm that is invisible to a human eye. The infection occurs after consumption of undercooked or raw meat from a particular animal, when the roundworms attach to the intestinal wall and lay eggs. After the eggs hatch the larvae migrate from the intestine and embed in muscle tissues throughout the human body.

Reservoir/Source

Common reservoirs of Trichina include pigs, dogs, cats, horses, rats, bear, walruses and foxes. Infection occurs when raw or undercooked meat from these animals is consumed.

Occurrence/Transmission

Trichinellosis occurs worldwide, and transmission occurs if raw or undercooked meat from infected animals is consumed. This disease cannot be spread from person to person.

Stages of Disease

The average incubation period for the disease is from 8 to 15 days, and the signs vary in humans depending upon the number of roundworms ingested. The first symptoms that appear are muscle soreness, swollen upper eyelids and fever, followed by orbital pain, retinal hemorrhage, photophobia, sweats, chills, weakness and diarrhea. Death is due to myocardial failure, which is a result of roundworms invading the heart muscle.

Treatment

The drugs of choice include albendazole or mebendazole to destroy roundworms in both the digestive tract and muscle tissues.

Prevention

Primary prevention consists of properly cooking meat from reservoirs of this disease. The proper cooking temperatures for various meats are:

- Whole pork muscle tissue must be cooked throughout to 145°F or greater for at least 15 seconds.
- Ground pork meat or other meat products must be cooked to 155°F or greater for at least 15 seconds.
- Stuffed pork meat or other stuffed meat products must be cooked to 165°F or greater for at least 15 seconds.

Other preventive measures include good hygienic practices and avoidance of cross-contamination. To prevent cross-contamination, raw meat, (such as pork) must be stored away from or below ready-to-eat foods in ice chests or other storage units, and all work surfaces thoroughly sanitized before and after each use.

Diseases – Quiz

1. Is food borne illness life threatening?
2. What groups of people are considered high risk?
3. What types of foods does pathogenic bacteria grow and multiply in?
4. Is cooked rice a potentially hazardous food?
5. How can botulism poisoning be prevented?
6. What types of foods are Campylobacter and Salmonella associated with, and how can these disease-causing organisms be destroyed?
7. What is the primary prevention of Cholera?
8. What is the primary reservoir of Escherichia coli 0157:H7, and how can this disease-causing organism be destroyed?
9. How can the spread of the disease Shigellosis be prevented during food preparation?
10. What is the primary source of Staphylococcal food poisoning, and how can this disease be prevented?
11. Can viral infections be treated with antibiotics?
12. How is Hepatitis A transmitted?
13. How can the spread of Norovirus be prevented?
14. What are the two primary organisms of concern for water borne disease?

LICENSES / INSPECTIONS / ENFORCEMENT

Licenses

The Coconino County Food Code defines a Food Service Operation as “an operation that stores, prepares, packages, serves, vends, or otherwise provides FOOD for human consumption.” Examples include the following: restaurants, bars, retail grocery stores, catering operations and mobile food units. All of these require a License from the Health Department. Operations that do not require a License include those that only offer prepackaged foods that are not potentially hazardous, produce stands and small bed and breakfast operations. (See chapter 1 of the Coconino County Food Code, “Definition No. 31” for a complete definition and for specific examples of operations that are “included” & “excluded”)

License Types

Food Service Licenses are divided into three main types based upon the food safety risk of that operation. The more preparation and food handling that is involved at an operation the higher the risk, and correspondingly, the higher the Food Service Type. The following are the three main Food Service Types with definitions and examples:

FOOD SERVICE TYPE 3 – HIGH RISK OPERATIONS

Operations that prepare and serve potentially hazardous foods

- BAKERIES
- CATERING
- DELIS
- PIZZA OPERATIONS
- RESTAURANTS
- SANDWICH OPERATIONS
- SCHOOL CAFETERIAS/KITCHENS
- SNACK BARS – (if they prepare raw ingredients i.e. serve more than hot dogs and nachos)



FOOD SERVICE TYPE 2 – MEDIUM RISK OPERATIONS

Operations that prepare commercially processed potentially hazardous foods and non-potentially hazardous foods

- FOOD PROCESSING OF HIGH ACID FOODS
- ICE MANUFACTURING
- MEAT DEPARTMENTS
- CONTINENTAL BREAKFAST (all potentially hazardous foods must be commercially processed – no preparation of raw ingredients)
- SNACK BARS (all potentially hazardous foods must be commercial processed – no preparation of raw ingredients)

FOOD SERVICE TYPE 1 – LOW RISK OPERATIONS

Operations that serve prepackaged food items or non-potentially hazardous foods

- BARS/LOUNGES
- COFFEE SHOP – (serving/preparing non-potentially hazardous foods only)
- RETAIL FOOD STORES
- VENDING MACHINE OPERATIONS
- WAREHOUSES

All food operations in Coconino County must apply for a health license from Coconino County Environmental Health. To apply, an applicant must complete an application form and schedule a pre-opening inspection to verify compliance of the facility with the Food Code. If a facility will be newly constructed or undergo remodeling, then the owner must go through plan review prior to construction.

No health license is transferable. All new owners must apply for a health license and pass a pre-opening inspection prior to operating. A copy of the Food Code may be obtained at the following website: <http://www.coconino.az.gov/health>. The health license must be posted in a visible location in the food facility.

Inspection Frequency

Routine inspection frequency of food facilities is once every 6 months that do not include follow up inspections and complaint investigations. All routine inspections must be unannounced. An official Food inspection report will be completed for each inspection (see Appendix A) and signed. The total number of critical and non-critical violations is listed in the top right-hand box.

Representatives of the health department must be allowed access to the food facility during normal hours of operation. Critical violations that are cited during a routine inspection must be corrected as soon as possible, but in 10 days or sooner. Non-critical violations that are cited during a routine inspection must be corrected in 90 days, or within the time specified on the inspection report.

A food facility must be closed immediately if an imminent health hazard exists and the health department must be notified of the closure. Examples of imminent health hazards include:

- Fire
- Electrical outage
- Sewage backflow
- Pest infestation

Inspection Form

During all inspections, an inspection form is used to document that inspection. The form is used by the inspector to document any violations found and to convey that information to the operator. Twenty eight Items are grouped into ten categories on the form. Items 1-27 are considered to be critical violations. Item 28 is where all non-critical violations are noted. Each item can be marked as in compliance (y), out of compliance (n), not observed (n/o), or as not applicable (n/a). Violations are marked on the form with specific remarks written down below. On the back side of the form all of the violations are listed with a reference to where they can be found in the Food Code. The following is a copy of the inspection form (front and back).

Violations: Critical and Non-Critical

Inspections – All violations of the Food Code are Class 3 Misdemeanors that may result in a \$500 fine and/or 30 days in jail per day for each violation.

When violations are found during an inspection they are classified as being either Critical or Non-critical. Critical Violations are those that are more likely to contribute to food contamination, illness, or environmental health hazard. These violations are related to food handling and storage. Examples include temperature controls, cooking and cooling procedures, employee health and hygiene (including proper hand-washing), food contamination, a knowledgeable and Health Department certified staff and proper insect and rodent control. Generally, these violations must be corrected ASAP and require a follow up inspection by the Health Department after 10 days to ensure that they have been corrected. Very serious critical violations may require immediate correction and/or closure of the facility. Non-critical violations are of a less serious nature and are usually allowed to be corrected within a 6 month timeframe. Usually, non-critical violations have to do with deficiencies to the physical structure of the building such as improper lighting, ventilation, cracked floors, etc.

Enforcement

- **Probation** – A licensed food facility may be placed on one year's probation if critical and non-critical violations are not corrected. Probation includes notification by a written notice outlining all violations repeated and is signed by the license holder and health authority. If the owner does not operate the facility in compliance with the Food Code during that time, then actions are taken to suspend and/or revoke the health license.
- **Suspension/Revocation of a License** – A citation notice will be presented to the owner of the licensed facility concerning the repeat violations and the date of the hearing. The Hearing Officer will make a decision to suspend and/or revoke a health license.

Inspections, Licenses & Enforcement – Quiz

1. Health licenses are transferable.
 - a. True
 - b. False

2. All violations of the Food Code are Class 3:
 - a. Misdemeanors
 - b. Felonies
 - c. All of the above
 - d. None of the above

3. Critical violations must be corrected within _____ or sooner:
 - a. 20 days
 - b. 15 days
 - c. 10 days
 - d. 5 days

4. A food facility must close immediately if an imminent health hazard exists.
 - a. True
 - b. False

FOOD MANAGEMENT RESPONSIBILITIES

Food Safety Requirements

At least one person per shift, or a minimum of two, must become certified through the County Food Managers' Course. A certified Food Manager must be on duty during all hours of operation. All other food staff must become certified through the County Food Handlers Course. Typically, the person-in-charge (PIC) is the person(s) that must become certified through the County Food Managers' Course.

Demonstration of Knowledge

The person-in-charge must demonstrate knowledge of the Food Code by:

1. Complying with the Food Code during an inspection by the Health Authority; and by
2. Responding correctly to questions about the Food Code that pertain to their food operation during an inspection; and by
3. Becoming certified through the County Food Managers' Course

The PIC is responsible for the training of employees in a food operation. On a day to day basis, managers of a food establishment have the potential to prevent food borne illness far more than any regulatory authority.

Reporting Communicable Diseases

The license holder must require food employees and applicants to report conditions of their health as they relate to diseases that are transmissible through food. A food employee must report the information as soon as possible to prevent the spread of disease.

Reporting is required if an employee has signs and symptoms including:

- Vomiting
- Diarrhea
- Fever
- Jaundice
- Sore throat and fever
- Lesion containing pus on an exposed part of their body

Reporting is required if an employee is diagnosed with or suspected of causing, or being exposed to a confirmed outbreak of:

- *Salmonella typhi*
- *Shigella spp.*
- *Escherichia coli* 0157:H7
- *Hepatitis A*
- *Norovirus*

Notification of Imminent Health Hazard

The PIC must notify the health department in the event of an imminent health hazard, such as a fire, flood, power outage, etc. Imminent health hazard means a significant threat or danger to health that is considered to exist when there is evidence sufficient to show that a product, practice, circumstance, or event creates a situation that requires immediate correction or cessation of operation to prevent injury based on:

- (i) The number of potential injuries, and
- (ii) The nature, severity, and duration of the anticipated injury.

Food Handlers with Communicable Diseases – Exclusions/Restrictions

In accordance with Arizona Administrative Code, Chapter 6, Article 3, Communicable Disease Control, Contact Control, Environmental Control, Special Control and Outbreak Control Measures must be adhered to.

When the regulatory authority has reasonable cause to suspect possible disease transmission by an employee of a food service facility, it may secure a morbidity history by an employee, or make any other investigation as indicated, and shall take appropriate action. The regulatory authority may require any or all of the following measures:

1. The immediate exclusion from the employee from the food facility;
2. The immediate closing of the food service facility until, in the opinion of the health Authority, no further danger of a disease outbreak exists;
3. Restriction of the employee(s) services to some part of the facility where there will be no danger of transmitting disease;
4. Adequate medical and laboratory examination of the employee(s) of body discharges.

Highly Susceptible Populations

A highly susceptible population means a group of persons who are more likely than healthy people to experience food borne disease. The Center for Disease Control and Prevention identifies four groups of people that are more susceptible to food and water borne diseases, and they include:

1. Pre-school aged children
2. Elderly
3. Immunocompromised individuals (Individuals who are already ill)
4. Pregnant Women

FOODBORNE ILLNESSES

SAFE FOOD "BENCHMARKS"

DISEASE (NAME)	DISEASE AGENT (CAUSE)	INCUBATION PERIOD	SYMPTOMS
STAPHYLOCOCCAL FOOD POISONING [An Intoxication]	<i>Staphylococcus aureus</i> - Bacteria commonly present in nose, throat, hair and skin: release toxin into food that is resistant to heat (survives boiling)	30 Minutes to 8 Hours [Usually 2-4 Hours]	Sudden & abrupt onset; Severe nausea, cramps, vomiting, prostration, and often some diarrhea; 2-3 days to recover.
SALMONELLOSIS [An Infection]	<i>Salmonella spp.</i> - Bacteria widespread in nature, live & grow in intestines of man & animals; some 800 types cause human illness; including "Typhoid"	6-72 Hours [Usually 12-36 Hours]	Acute intestinal disease, with sudden onset of headache, abdominal pain, diarrhea, nausea, and sometimes vomiting; almost always a fever; Lasts several days to many weeks; "Carriers" possible.
SHIGELLOSIS [An Infection]	<i>Shigella spp.</i> - Bacteria found in humans (and some other primates); humans the only significant source	12-96 Hours [Usually 1-3 Days]	Acute intestinal disease; diarrhea and fever, nausea, and sometimes vomiting & cramps; Blood & mucus common in stool; 4-7 days illness typical; Asymptomatic & mild cases occur.
HEPATITIS 'A' [An Infection]	<i>Hepatitis 'A' Virus (HAV)</i> - A virus found in humans (and some other primates); humans the only significant source	15-50 Days [Usually 28-30 Days]	Usually abrupt onset; Fever, malaise, nausea, & abdominal discomfort, followed by jaundice; 1-2 weeks to many months illness; Mild to severe cases occur.
E. COLI [EHEC] [An Infection]	<i>Escherichia coli 0157:H7</i> - Bacteria found mainly in cattle, but also humans & perhaps deer [NOTE: Other strains of this bacteria also]	2-8 Days [Usually 3-4 Days]	Bloody diarrhea, but cases vary from mild (no blood) to severe (all blood); uremic poisoning and kidney failure can occur (2-7% cases); usually NO fever unlike Shigellosis
CLOSTRIDIUM PERFRINGENS [Toxin-Mediated Infection]	<i>Clostridium perfringens</i> - Bacteria common in the environment and gut of many animals; produce 'spores' which survive very harsh conditions and hence survive in soil & sediments; toxin released in intestine, not in the food	6-24 Hours [Usually 10-12 Hours]	Sudden & abrupt onset of colic & then diarrhea; nausea common but vomiting uncommon; usually no fever; 1-2 day recovery normal [Type C strain rare but very serious illness]
BOTULISM FOOD POISONING [An Intoxication]	<i>Clostridium botulinum</i> - Bacteria common in the environment (soils & water) and gut of many animals; produce 'spores' which survive very harsh conditions and hence survive in soil & sediments; produce a neurotoxin	Several Hours - Several Days [Usually 12-36 Hours]	Vomiting, diarrhea or constipation may occur initially, but neurological symptoms develop (blurred vision, difficulty swallowing, etc.), then paralysis and inability to breathe. [Several strains exist]

RESOURCES FOR MORE INFORMATION ON FOODBORNE ILLNESSES:

- BAD BUG BOOK**, U.S. FOOD & DRUG ADMINISTRATION/ CENTER FOR FOOD SAFETY & APPLIED NUTRITION /
FOODBORNE PATHOGENIC MICROORGANISMS AND NATURAL TOXINS HANDBOOK.
<http://vm.cfsan.fda.gov/~mow/intro.html>
- CONTROL OF COMMUNICABLE DISEASES MANUAL**, AMERICAN PUBLIC HEALTH ASSOCIATION PUBLICATION/
JAMES CHIN, MD, MPH, EDITOR / ISBN 0-87553-242-X (SOFT COVER) OR ISBN 0-87553-182-2 (HARD COVER) / 17TH EDITION, 2000.

Food Management Responsibilities – Quiz

1. Demonstration of Knowledge includes:
 - a. Compliance with the Food Code during a health inspection
 - b. Food Managers are certified through this food safety course
 - c. Correctly answering questions that pertain to the food facility during a health inspection
 - d. All of the above

2. An employee must report to the manager if he/she has:
 - a. Vomiting
 - b. Diarrhea
 - c. Fever
 - d. Jaundice
 - e. All of the above

3. Name the four high risk groups, that are more susceptible to communicable diseases:
 - a.
 - b.
 - c.
 - d.

4. Food handlers with communicable diseases must be excluded or restricted from a food operation in accordance with the Arizona Administrative Code.
 - a. True
 - b. False

FOOD CONTROLS

What is a Potentially Hazardous Food (PHF)?

Potentially hazardous food means a FOOD that is natural or synthetic and that requires temperature control because it is in a form capable of supporting:

- (a) The rapid and progressive growth of infectious or toxigenic microorganisms;
- (b) The growth and toxin production of *Clostridium botulinum*; or
- (c) In raw shell eggs, the growth of *Salmonella enteritidis*.

Potentially hazardous food includes animal FOOD (a FOOD of animal origin) that is raw or heat-treated; a FOOD of plant origin that is heat-treated or consists of raw seed sprouts; cut melons; and garlic-in-oil mixtures.

Potentially hazardous food does not include:

- (a) An air-cooled hard-boiled egg with shell intact;
- (b) A FOOD with a water activity (AW) value of 0.85 or less;
- (c) A FOOD with a pH level of 4.6 or below when measured at 24°F (75°F);
- (d) A FOOD, in an unopened HERMETICALLY SEALED CONTAINER, that is commercially processed to achieve and maintain commercial sterility under conditions of nonrefrigerated storage and distribution;
- (e) A FOOD for which laboratory evidence demonstrates that the rapid and progressive growth of infectious or toxigenic microorganisms or the growth of *S. enteritidis* in eggs or *C. botulinum* cannot occur, such as a FOOD that has a water activity and a pH that are above the levels specified, and that may contain a preservative, other barrier to the growth of microorganisms, or a combination of barriers that inhibit the growth of microorganisms; or
- (f) A FOOD that does not support the growth of microorganisms even though the FOOD may contain an infectious or toxigenic microorganism or chemical or physical contaminant at a level sufficient to cause illness.



Potentially Hazardous Foods include the following groups:

- Meats, poultry, fish, seafood
- Whole shell eggs and pooled eggs
- Dairy products (milk, cheese, yogurt, ice cream)
- Cooked vegetables (sauteed onions, baked potatoes, broccoli, etc.)
- Cooked grains (rice, pasta)
- Cooked beans and legumes (pinto, soy, garbanzo, black beans, etc.)
- Seed sprouts (alfalfa sprouts, mung bean sprouts, radish sprouts, etc.)
- Cut melons (cantaloupes, honeydew, watermelon)
- Cut tomatoes
- Garlic in Oil Mixtures

The way to determine if a food is potentially hazardous is to read the manufacturer's label on the container or package of food. If a food label explicitly states that the food must be refrigerated, then the food must be treated as potentially hazardous. If in doubt about a particular food item always refrigerate it.

Temperature Danger Zone

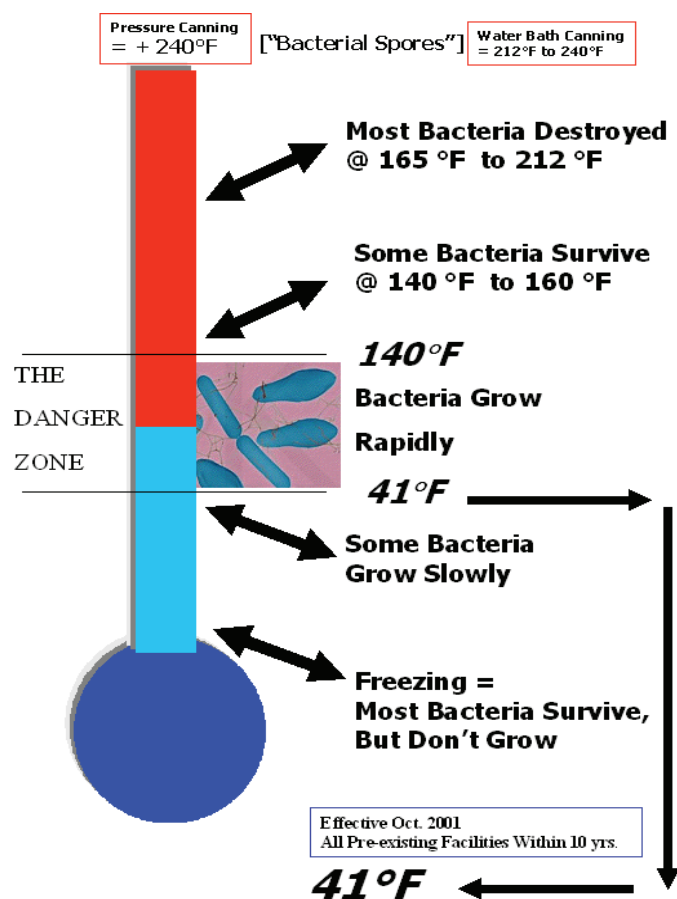
One of the most important aspects in the prevention of food borne illness is maintaining proper refrigeration temperatures.

Currently there are two Temperature Danger Zones:

41°F—140°F and 45°F—140°F

The Food Code allows food operations licensed prior to October 3, 2001, to maintain cold-holding temperatures at 45°F until October 2011, unless the operation changes owners or the equipment is replaced.

When food is in the temperature danger zone, bacteria have the chance to grow and can increase in numbers. When bacteria populations grow the risk for food borne illness increases. To keep food safe, food must be kept out of the temperature danger zone except for a brief period during preparation but may not exceed 4 hours. A PHF must be discarded after being left on the temperature danger zone for more than 4 hours. Refrigeration does not completely stop germs from growing in food, therefore,



food must be date marked.

Date Marking

PHF's that are ready-to-eat (RTE) and are to be held for more than 24 hours in refrigeration, must be date marked with two dates, the date of "PREPARATION or OPENING," and the date it must be "CONSUMED or DISCARDED". There are two specific time periods of how long food can be stored. These time periods are based on the storage temperature of the food. If RTE, PHF's are held refrigerated more than 24 hours, then food must be date marked as follows:

Temperature Time Period

45°F Maximum of 4 Days

41°F Maximum of 7 Days

If an item is frozen after preparation, then indicate the number of remaining days the food is good for after it is removed from a freezer (note that the time is cumulative).

Metal Stem-Type Thermometers

Metal stem thermometers must be accurate $\pm 2^{\circ}\text{F}$ to check cooking temps, and hot and cold holding temperature.

Calibration of Thermometers

Bimetal bayonet style thermometers shall be calibrated daily to ensure accuracy. A calibration check may be performed using the following procedure. In a suitable container, such as styrofoam, glass, or plastic, place water and ice in 30% to 70% ratio. Submerge the probe of the thermometer at least 2" into the mix and allow it to stand until the thermometer stabilizes. The thermometer should read 32°F at this time. If it does not, adjust the thermometer to read 32°F by turning the nut located behind the thermometer face until it reads 32° (You must adjust the thermometer while the probe remains submerged in the ice and water bath). Checking a thermometer using boiling water is not accurate unless you know your elevation and the boiling point of water at that specific elevation.



Transportation/Receiving Temperatures

- a. Refrigerated PHF's shall be held at a temperature of 41°F or below when received.
- b. Shell eggs must be received at 45°F or less.
- c. PHF that is cooked to a temperature and for a time specified and received hot shall be held at a temperature of 140°F or above.
- d. A food that is labeled frozen and shipped frozen by a food processing plant shall be received frozen.

e. Upon receipt, PHF shall be free of evidence of previous temperature abuse.

All establishments are required to check the status/temperature of each delivery of PHF to ensure 41°F or less is met. A written record shall be maintained to document this procedure. The minimum information required is date of delivery, supplier name, product name, and temperature/status.

These records will be kept for 90 days and be available for inspection during all hours of operation.

ALL PHF's must be transported as follows:

1. If refrigerated, at 41°F or less;
2. If hot, at 140°F or above; and
3. Frozen foods must be frozen

Shellfish Tags

If a food service operator serves molluscan shellfish (oysters and clams) then they must retain the shellfish tags or labels for 90 days from the date the container is emptied.

Food Source & Condition

All Foods must come from an approved Source, be safe, unadulterated, honestly presented and labeled according to law.

An “Approved Source” means Source(s) that comply with the law and are inspected by a legally mandated agency such as U.S.D.A., F.D.A., State, County and City Agencies. Examples include the State Dairy Commission and the Ministry of Agriculture & Forestry For Imported Venison Meat.

Foods MAY NOT be prepared In A “Private Home”

[See definitions of “food establishment” for possible exclusions]

All foods must be safe and unadulterated. An adulterated food is one that has been degraded, contaminated and/or made unsafe. Examples include: Time-temperature abuse, foods in the temperature danger zone too long, dented cans (see below), pesticides, unsafe dyes, filth, etc.

Cans are considered adulterated and must be discarded when one or more of the following conditions exist:

1. The can is dented along the top, bottom, or side seam.
2. The can has rusted and/or pitted metal.
3. The can is dented into a crease (can be located anywhere on the can).
4. The can is swollen.

Thawing

Potentially hazardous foods must be properly thawed. Thawing food at room temperature or in standing water is prohibited. Approved thawing methods include:

1. Thawing PHF in the refrigerator (this is the safest method);
2. Thawing in a food preparation sink under cool (70°F or less) running and draining water; or
3. Thawing by cooking from a frozen state or microwave as part of a continuous cooking process.

When food is thawed it must be cooked immediately. Once a food has been thawed or partially thawed it can not be REFROZEN unless it has been cooked.

Cold and Hot Holding

- All potentially hazardous foods must be held in cold storage at 45°F or 41°F or less (whole shell eggs are an exception and may be held at 45°F or less).
- All potentially hazardous foods in hot holding must be held at 140°F or above.

Time Only As a Public Health Control

Potentially hazardous foods may be kept in the temperature danger zone for a maximum of 4 hours if:

1. The food item is clearly labeled with the time that the food is to be discarded.
2. A written standard operating procedure is made for the use of time and is kept at the facility for Health Department review.

All potentially hazardous foods kept in the temperature danger zone for greater than 4 hours or unmarked shall be considered adulterated and must be discarded. Time only **may not be used** in servicing highly susceptible populations.

Cooking Temperatures

The cooking temperatures listed below are minimum cooking temperatures (see Appendix).

Foods should be cooked to these temperatures in order to kill specific pathogens that exist in that food. For example, poultry must be cooked to 165°F to kill Salmonella. Minimum cooking temperatures must be reached and held for at least 15 seconds in order to make the food safe.

130°F: Whole beef roasts

140°F: Commercially processed foods, fruits and vegetables

145°F: Customer order shell eggs, fish, whole intact muscle of pork and beef.

155°F: Ratites (ostrich and emu meat); injected meats, ground (comminuted) meats like hamburger and fish sticks

165°F: Poultry; stuffed meats, stuffed pastas, stuffing, food cooked in the microwave

Microwave Cooking/Reheating

Any food cooked or reheated in a microwave oven must be covered, cooked to 165°F, stirred at least once during cooking, and then left to stand for a minimum of two minutes prior to serving. All temperatures should be checked with a calibrated thermometer.

Consumer Advisory

If guests are allowed to order potentially hazardous foods raw or undercooked, such as oysters on the half shell, hamburgers, eggs, etc. then the operator must provide a consumer advisory to the guest in writing by menu advisories brochures, label statements, table tents, placards, or other effective written means about the hazards associated with eating these foods.

There are two components to satisfactory compliance: Disclosure and Reminder.

Disclosure is satisfied when:

- (1) Items are described, such as:
 - (a) Oysters on the half-shell (raw oysters),
 - (b) Raw-egg Caesar salad, and
 - (c) Hamburgers (can be cooked to order); or
- (2) Items are asterisked to a footnote that states that the items:
 - (a) Are served raw or undercooked, or
 - (b) Contain (or may contain) raw or undercooked ingredients.

Reminder is satisfied when the items requiring disclosure are asterisked to a footnote that states:

- (1) Regarding the safety of these items, written information is available upon request;¹
- (2) Consuming raw or undercooked meats, poultry, seafood, shellfish, or eggs may increase your risk of foodborne illness; or
- (3) Consuming raw or undercooked meats, poultry, seafood, shellfish, or eggs may increase your risk of foodborne illness, especially if you have certain medical conditions.

Essential criteria for such written information are being developed and will be made available, with a downloadable model brochure, on the CFSAN Web Page at <http://www.cfsan.fda.gov>. All brochures must meet these essential criteria.

Cooling of Hot PHF's

There are two approved cooling methods:

1. Cool from 140°F to 45°F or less within 4 hours
2. Cool from 140°F to 70°F within 2 hours, then to 41°F or less within 4 hours.

If you cool in the refrigerator or freezer, the hot food must be no more than two inches deep in any type of container. Other acceptable cooling methods include:

- Pack container in an ice bath
- Put container in cold water bath
- Add ice to food
- Use blast chiller equipment

Reheating

All leftover foods must be rapidly reheated to 165°F as soon as possible but within two hours. A food may only be used as a leftover once. Any PHF reheated in a microwave oven must be reheated to 165°F, stirred at least once during covered-cooking, and then left to stand for a minimum of two minutes prior to serving.

Food Protection

Care must be taken by a food server to protect food from becoming contaminated during service.

Contamination of food may occur if:

1. Food is not properly covered and guests accidentally spit, sneeze, or drop hair on the unprotected food.
2. Dispensing utensils are not provided for guests to keep them from touching the food.
3. Insects, such as flies or other animals are allowed access to the food.
4. Food is not protected from inclement weather, such as rain and wind.

Special Requirements for Buffets and Salad Bars

1. Food on display at a buffet or salad bar shall be protected from contamination by the use of packaging, container lids, sneeze guards, display cases or other effective means.

2. Consumer self-service operations for READY-TO-EAT FOODS shall be provided with suitable UTENSILS or effective dispensing methods that protect the FOOD from contamination.

3. Consumer self-service operations such as buffets and salad bars shall be monitored by FOOD EMPLOYEES trained in safe operating procedures.

4. Food employees and/or consumers may not reuse soiled plates, bowls, forks, knives, spoons or other tableware to obtain additional food from the buffet or salad bar. Drinking cups and glasses may be reused if refilling is a contamination-free process.



Bulk Dispensing

Potentially hazardous foods may not be bulk dispensed at a retail operation.

Bulk foods dispensed at a retail operation must have scoops that are tethered or attached that prevent the scoop from falling on the ground.

Special Requirements for Highly Susceptible Populations

Food establishments that serve highly susceptible populations may not serve or reserve the following because of increased risk of contracting a disease:

- Any prepackaged fruit or vegetable juice that is not pasteurized (this also applies to children in a school or daycare setting).
- Un-pasteurized Raw shell eggs.
- Returned food in unopened original packages including items such as salt and ketchup packets.
- Raw animal food including soft cooked eggs or raw seed sprouts.
- Partially cooked animal food such as lightly cooked fish and rare meat.

Food Controls – Quiz

1. How many days can potentially hazardous foods (commercially prepared and/or prepared onsite) that are ready to eat be stored in the refrigerator?
 - a) For 4 days if held at 45°F or less.
 - b) For 7 days if held at 4°F or less.
 - c) Both A and B are correct.
 - d) None of the above are correct.

2. Which of the following methods is acceptable for handling ready to eat foods?
 - a) With bare hands, provided they are clean.
 - b) With single-use, non-latex gloves.
 - c) With suitable utensils (spatulas, tongs, etc.).
 - d) Both b and c are correct.

3. Which of the following foods is NOT considered potentially hazardous?
 - a) Cooked Vegetables
 - b) Meat and dairy products
 - c) Cut lettuce
 - d) Sprouted Seeds

4. Raw ground beef must be cooked to what internal temperature?
 - a) 110°F
 - b) 145°F
 - c) 155°F
 - d) 165°F

5. Processed foods like hot dogs do not have a required cooking temperature, they must only be served warm.
 - a. True
 - b. False

-
6. What are the two components to satisfactory compliance with a consumer advisory?
- a) Disclosure and Abatement
 - b) Disclosure and Reminder
 - c) Reminder and Notice
 - d) None of the Above
7. What is the safest thawing method?
- a) Thawing In the refrigerator
 - b) Thawing in a food preparation sink under cool (70°F or less) running and draining water
 - c) Thawing by cooking from a frozen state or microwave as part of a continuous cooking process.
 - d) Thawing in the open air at room temperature
8. What is the cooking temperature of chicken and other poultry?
- a) 130°F
 - b) 145°F
 - c) 155°F
 - d) 165°F
9. If you cool in the refrigerator or freezer, what is the maximum depth that the food can be in the container?
- a) 1 foot
 - b) 6 inches
 - c) 2 inches
 - d) 8 inches
10. It is legal to prepare food in the home, bring it to a restaurant and sell it.
- a. True
 - b. False
11. Consumers may re-use soiled plates at a buffet.
- a. True
 - b. False

FOOD EQUIPMENT

Certification and Classification

Food equipment that is certified or classified for sanitation by an American National Standards Institute (ANSI) accredited certification program, such as the National Sanitation Foundation (NSF) and the Bakery Industry Sanitation Standards Committee (BISSC).

Equipment Materials

Materials that are used in the construction of utensils and food contact surfaces of equipment may not allow the migration of deleterious substances or impart colors, odors, or tastes to food and under normal use conditions must be:

- Safe
- Durable, corrosion resistant, and non-absorbent
- Sufficient in weight and thickness to withstand repeated washing
- Finished to have a smooth, easily cleanable surface
- Resistant to pitting, chipping, crazing, scratching, scoring, distortion and decomposition

Some items that may not be reused include opened hermetically sealed metal food containers, plastic bags, plastic cups and plastic spoons, forks and knives.

The following materials have specific uses:

Cast Iron – Cast iron may only be used for cooking

Copper – Copper and copper alloys may be used in contact with beer brewing ingredients that have a pH below 6.0. Copper and copper alloys may not be used in contact with a food that has a pH below 6.0, such as vinegar, fruit juices and other acid foods.

Galvanized metal – Galvanized metals may not be used for utensils or food contact surfaces of equipment that are in contact with acidic food.

Sponges – Sponges may not be used in contact with cleaned and sanitized or in-use food contact surfaces.

Lead in Pewter Alloys – Pewter alloys containing lead in excess of 0.05% may not be used as food contact surfaces.

Wood – Only hard maple or an equivalently hard, close-grained wood may be used for cutting boards and wooden paddles. Teflon coating – Perfluorocarbon resin coating must be used with non-scouring utensils and cleaning aids to prevent scratching. Cooking equipment with a scratched Teflon® surface must be discarded.

Storage of Food Equipment

Cleaned and sanitized food equipment, utensils, clean linen, and single-service articles may not be stored:

- In locker rooms
- In toilet rooms
- In garbage rooms;
- In mechanical rooms
- Under sewer lines that are not shielded to intercept potential drips
- Under leaking water lines including leaking automatic fire sprinkler heads or under lines on which water has condensed
- Under open stairwells, or
- Under other sources of contamination

Food Equipment – Quiz

1. Home style equipment, such as refrigerators may be used in a food operation.
 - a. True
 - b. False

2. Wooden cutting boards must be constructed of:
 - a. Pine
 - b. Birch
 - c. Maple
 - d. All of the above

3. Opened hermetically sealed metal food containers may be reused:
 - a. True
 - b. False

4. NSF stamps on food service equipment stands for:
 - a. National Science Foundation
 - b. National Sanitation Foundation
 - c. National Safety Foundation
 - d. National Service Foundation

Notes

EMPLOYEE HYGIENE

Employee Hygiene

One of the most important practices in a food establishment is good hygiene. Implementing good hand washing may prevent transmission of most food borne diseases. It is especially important and challenging to implement good hand washing methods as well as other hygienic practices in different types of food operations. The following sections describe what is required.

The main ways that food handlers spread hazards are by:

- Not washing hands,
- Eating and drinking around food and clean equipment and
- Coming to work ill with symptoms, such as diarrhea, vomiting, wound infections and nose discharges.
- Not wearing clean clothes,
- Not keeping hair out of food,



Following the simple steps outlined below can easily prevent most diseases:

Hand Washing

Why and When

It is important that food handlers wash hands and equally important to follow proper hand washing procedures to prevent the spread of diseases. The Food and Drug Administration has documented improper hand washing as one of the primary causes of food borne illness in the nation.

Food servers must wash hands thoroughly to remove soil and contamination after:

1. You enter the kitchen
2. Going to the rest room
3. Coughing and sneezing
4. Touching any parts of your bodies
5. Busing tables and handling trash
6. Touching raw eggs, meat, fish, or poultry
7. Food preparation
8. Each break
9. Changing tasks
10. Smoking and eating
11. Any task that contaminates hands



How and Where

Proper hand washing procedures include:

1. Washing hands, wrists and exposed portions of the arms in at least 110°F water,
2. Using dispensed soap (bar soap is not allowed),
3. Lather for at least 20 seconds
4. Rinse, and
5. Dry with paper towels or hot air

Hand sanitizers that are approved by the Food & Drug Administration (FDA) may be used after hands are thoroughly washed, but not in place of hand washing. Disposable gloves may not be substituted for hand washing. **FOOD HANDLERS MUST WASH THEIR HANDS AS OFTEN AS NECESSARY TO PREVENT CONTAMINATION!**

Hand washing must be done in a sink designated for hand washing only, and does not include a dish wash sink, food preparation sink, or a mop sink.

Food Handling

What is a Ready to Eat (RTE) food?

A ready to eat food is a food that will not be cooked or reheated before it is served. For example, cold sandwiches, green salads, potato salad, garnishes, bread, raw washed cut fruits and vegetables, shelled nuts, husked corn, peeled fruit, etc.

Proper handling

Disease-causing germs are found on the skin of your hands. This is why bare-hand contact with ready to eat food is not allowed.

Any ready to eat food must NOT be handled with bare hands. Instead of using bare hands, use non-latex single use gloves, tongs, deli-tissues, spatulas, or other utensils that will dispense or handle food. Latex gloves can cause allergic reactions in some people, this is why they are not allowed. Non-latex substitutes include plastic and vinyl.

Other Hygienic Practices

Eating, Drinking and Smoking

Eating and drinking are not allowed in food preparation and storage areas. Closed beverage containers are allowed as long as they are stored away from food, food equipment, single-service items and as long as their use prevents cross-contamination.

When testing your food for taste, a utensil must be used and it may only be used once.

Taste testing with the fingers is not allowed!

Smoking is not allowed in any public facility.

Any time you eat, snack, drink, or smoke “WASH YOUR HANDS BEFORE” returning to work.

Hair restraints

Food handlers must wear effective hair restraints prior to handling food. Acceptable hair restraints may include hairnets, caps, hats, bandanas, beard-nets, or any other device that keeps hair out of food.

Jewelry and Fingernails

Jewelry is not allowed on hands or arms except for a plain wedding band. Fingernails must be kept trimmed, filed, and clean. However, for persons who have painted fingernails or artificial nails, gloves must be worn when working with or around exposed food.

Hygiene – Quiz

1. On a day-to-day basis, the primary way that food handlers contaminate food is by:
 - a. Not washing hands,
 - b. Eating and drinking around food and clean equipment and
 - c. Coming to work ill with symptoms, such as diarrhea, vomiting wound infections and nose discharges.
 - d. Not wearing clean clothes,
2. What temperature must the water be to wash hands?
 - a. 100°F
 - b. 110°F
 - c. 120°F
 - d. None of the above
3. Bar soap may be used to wash hands.
 - a. True
 - b. False
4. The only acceptable jewelry that may be worn by a food handler is:
 - a. Watch
 - b. Plain wedding band
 - c. Diamond ring
 - d. All of the above
5. Hair restraints are not required for beards.
 - a. True
 - b. False
6. Food handlers may use which of the following to handle ready-to-eat food:
 - a. Deli tissues
 - b. Tongs
 - c. Disposable gloves
 - d. All of the above
7. What type of material may not be used for disposable gloves in a food operation?
 - a.
8. A Ready-to-Eat Food is a food that is not cooked prior to serving.
 - a. True
 - b. False
9. False nails are not allowed to be worn by food handlers.
 - a. True
 - b. False
10. How long must you lather your hands?
 - a. 10 seconds
 - b. 20 second
 - c. 30 seconds

CROSS CONTAMINATION

Introduction

Cross contamination is the contamination of a food product from another source. There are three main ways cross contamination can occur:

- (1) Food to food
- (2) People to food
- (3) Equipment to food

Preventing cross contamination is one of the ways we help to eliminate food-borne illness. Cross contamination is a common factor in the cause of many food-borne illnesses. Foods can become contaminated by bacteria and viruses from many different sources during food preparation and storage process.

Food to food

FOOD shall be protected from cross contamination by:

- (1) Separating raw animal FOODS during storage, preparation, holding, and display from:
 - (a) Raw READY-TO-EAT FOOD including other raw animal FOOD such as FISH for sushi or MOLLUSCAN SHELLFISH, or other raw READY-TO-EAT FOOD such as vegetables, and
 - (b) Cooked READY-TO-EAT FOOD;
- (2) Except when combined as ingredients, separating types of raw animal FOODS from each other such as beef, FISH, lamb, pork, and POULTRY during storage, preparation, holding, and display.

Ready-to-eat foods (R.T.E.) are defined as foods that are in a form that are edible without washing, cooking, and additional preparation by the food establishment or the consumer and that are reasonably expected to be consumed in that form. Examples of ready-to-eat foods would be foods such as potato chips, bakery products, raw fruits and vegetables and etc. Foods that are not cooked before being served to the public can also go into this category, such as salads, etc.

You must also separate raw animal foods from other foods by:

1. Food arrangements that prevent cross contamination. This mostly applies to the storage of foods. Keeping in mind the temperatures foods need to be cooked to for safe food service, can help in the storage of foods. For example, see picture below showing proper storage of foods. If the contaminated foods are then served to the public, a food-borne illness could occur.

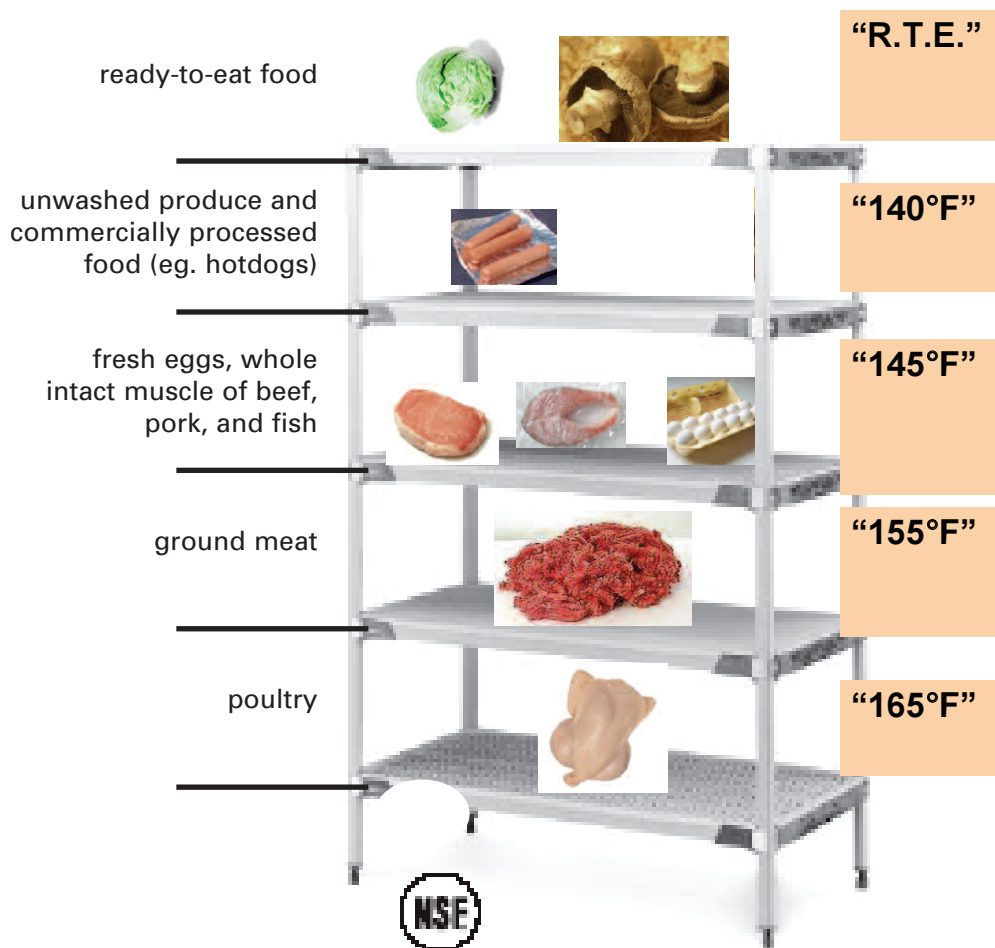


Illustration of proper storage. Note the temperatures.

2. Utilizing separate times and areas for each food type. For example, if you have the storage space, you could designate different storage areas for each type of food. One refrigeration unit could be used for dairy foods, while another is used for meats, and etc. You could also have separate times for the preparation of certain foods limiting the chance that these foods would come into contact with others.

An exception to the above rules occurs when foods are combined as different ingredients. This occurs in the case of a casserole, for example. When preparing these types of foods you must understand the temperature requirements of the most hazardous ingredient. If you have a casserole, for example, which contains mushroom soup, string beans, and chicken as the main ingredients, you would have to know chicken is the most hazardous ingredient for your dish, and it would have to be stored and prepared accordingly (cooked to at least 165°F for 15 seconds, and etc.). An understanding of the critical control points is your best defense against contamination in these situations.

Proper storage can also include making sure that foods are never stored directly on the floor. All foods must be stored at least six (6) inches off the floor to prevent contamination and to facilitate cleaning. Foods should always be covered when being stored to prevent contamination. A possible exception to this rule may be when cooling foods, but care must be taken that foods are never in a situation where over head contamination could occur (for example, cooling foods under a ceiling fan), or that foods are not left out longer than four (4) hours in the temperature danger zone (see food controls section).



Store all foods and food products six inches off the floor.



Cover or enclose all foods.

People to food

FOOD EMPLOYEES shall clean their hands and exposed portions of their arms as specified under § 2-301.12 immediately before engaging in food preparation including working with exposed FOOD, clean EQUIPMENT and UTENSILS, and unwrapped SINGLE-SERVICE and SINGLE-USE ARTICLES and:

- (A) After touching bare human body parts other than clean hands and clean, exposed portions of arms;
- (B) After using the toilet room;
- (C) After caring for or handling SERVICE ANIMALS or aquatic animals as specified in ¶ 2-403.11(B);
- (D) Except as specified in ¶ 2-401.11(B), after coughing, sneezing, using a handkerchief or disposable tissue, using tobacco, eating, or drinking;
- (E) After handling soiled EQUIPMENT or UTENSILS;
- (F) During FOOD preparation, as often as necessary to remove soil and contamination and to prevent cross contamination when changing tasks;
- (G) When switching between working with raw FOOD and working with READY-TO-EAT FOOD; and
- (H) After engaging in other activities that contaminate the hands.



People can also be a source of cross contamination to foods. Some examples are:

- 1. Handling foods after using the toilet without first properly washing your hands.
- 2. Touching raw meats and then preparing vegetables without washing hands between tasks and not using non-latex gloves (The “Bare Hand Contact” rule).
- 3. Using an apron to wipe your hands between handling different foods, or wiping a counter with a towel and then using it to dry your hands.
- 4. Tasting food using the same utensil over and over. A food employee may not use a utensil more than once to taste food that is to be sold or served.
- 5. Sticking your hand into ice that is intended for human consumption without first washing your hands (i.e. searching around in an ice machine for a buried ice scoop and etc.) Always store ice scoops with handles up in ice or store them in easily cleanable situations near the ice machine (i.e. in holders, on plastic or metal trays, etc.)

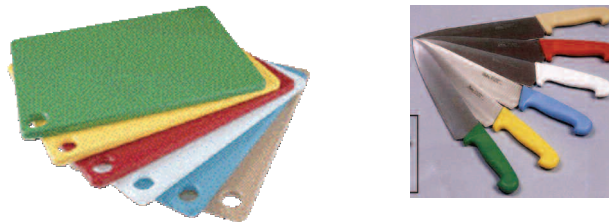
Equipment to food

- (a) Using separate EQUIPMENT for each type, or
- (b) Arranging each type of FOOD in EQUIPMENT so that cross contamination of one type with another is prevented, and
- (c) Preparing each type of FOOD at different times or in separate areas;
- (3) Cleaning EQUIPMENT and UTENSILS as specified under ¶ 4-602.11(A) and SANITIZING as specified under § 4-703.11;

-
- (4) Except as specified in ¶ (B) of this section, storing the FOOD in packages, covered containers, or wrappings;
 - (5) Cleaning HERMETICALLY SEALED CONTAINERS of FOOD of visible soil before opening;
 - (6) Protecting FOOD containers that are received PACKAGED together in a case or overwrap from cuts when the case or overwrap is opened;
 - (7) Storing damaged, spoiled, or recalled FOOD being held in the FOOD ESTABLISHMENT as specified under § 6-404.11; and
 - (8) Separating fruits and vegetables, before they are washed as specified under § 3-302.15 from READY-TO-EAT FOOD.

Contamination can also be passed from kitchen equipment and utensils to food. This type of contamination occurs because the equipment or utensils were not properly cleaned and sanitized between each use. One of the most typical examples of this type of cross contamination occurs when a raw meat, such as chicken, is prepared at a cutting board. If the cutting board and utensils used to prepare the chicken are then used to prepare a salad without being washed and sanitized in between you can have a cross contamination of the salad and a potential food-borne illness situation. Here are some ways to avoid cross contamination in your food facility:

1. Use separate equipment for each food type. Try to do this as much as possible. Examples of this approach include using one cutting board and knife for only produce, and another for only raw chicken, and etc. Some facilities will use a color code for cutting boards and knives to insure it is only used for one type of procedure. You still must wash and sanitize between uses.



Color coded cutting boards and knives.

2. Properly clean and disinfect all food contact surfaces between each use. Make sure your sanitizer buckets are at the proper sanitizer levels and ready for use throughout your operational day.
3. Clean and sanitize sealed containers of foods before opening them.
4. Be careful when opening case lots of foods with sharp cutters. You may cut too deeply and contaminate the enclosed bags of food.
5. Provide a separate storage and isolated storage area for damaged, spoiled, and recalled foods. Make sure they don't get into the regularly used food storage areas.
6. Separate all unwashed and uncooked fruits and vegetables from ready-to-eat foods.
7. Store foods in protective packages, covered containers, or wrappings. Do not store canned foods in their cans after opening, but transfer the foods to protective containers.
8. Never store items in ice intended for human consumption. (i.e. storage of beverage bottles, milk and juice cartons and etc.)

The following foods are exempt from the above rules:

1. Whole, uncut, raw fruits and vegetables and shell nuts which require peeling or hulling before consumption.
2. Raw slabs of meat hung on sanitized hooks or racks.
3. Whole, uncut, processed meats on sanitized racks.
4. Shell stock.

Cross contamination can occur in literally hundreds of ways. Be aware of the critical control points of the foods in your establishment. Plan ahead and establish procedures that insure the safety of your foods. Develop good habits when handling foods. If you:

1. Wash your hands thoroughly between handling different foods or after using the toilet;
2. Wash and sanitize all equipment and utensils that come in contact with food;
3. Avoid touching your face, skin, and hair, or wiping your hands on cleaning clothes;
4. Store foods properly by separating washed or prepared foods from unwashed or raw foods; and finally
5. Try preparing each type of food at different times, and then clean and sanitize food contact surfaces between each task;

You will have gone a long way in providing safe food to your customers.

Cross Contamination – Quiz

1. Which one of the following would MOST likely cause serious bacterial contamination?
 - 1) A flour or ice scoop.
 - 2) A salt or pepper shaker.
 - 3) A deep-grease fryer.
 - 4) A meat-slicer or cutting board.
2. An example of PROPER vertical food storage is:
 - 1) Raw chicken over raw ground beef.
 - 2) Raw ground beef over lettuce.
 - 3) Cooked chicken over raw ground beef.
 - 4) Raw fish over jello dessert.
3. Cross contamination may occur when:
 - 1) Disposable gloves are not changed as needed.
 - 2) Hands are not washed as needed.
 - 3) Utensils are not washed and sanitized between uses.
 - 4) All of these.
4. The main way to cross contaminate food is:
 - 1) Food to food.
 - 2) People to food.
 - 3) Equipment to food.
 - 4) All of these.
5. An example of a ready-to-eat food is:
 - 1) A fried hamburger.
 - 2) Scrambled eggs.
 - 3) A three-cheese casserole.
 - 4) A donut.

True or False

6. HANDS are probably the most common way food handlers contaminate food and food contact surfaces.
7. The Coconino County Food Code calls for all raw animal foods to be separated from all ready-to-eat foods.
8. Raw chicken should ALWAYS be stored above ground beef.
9. Foods should be stored at least six inches off the floor to avoid contamination.
10. The “Bare Hand Contact” rule applies only to employees that have used the restroom.

Notes

DISHWASHING AND SANITIZING

(HOW OFTEN TO CLEAN EQUIPMENT AND DEFINE AND EXPLAIN WHY YOU SANITIZE)

Food Contact Surfaces & Equipment Cleaned Frequently to prevent Food Contamination

Equipment must be washed and sanitized before, during and after each use; whenever they become contaminated so that surfaces are free of encrusted deposits, free of accumulation, clean to sight and touch that includes:

- Between working with different raw animal foods
- Each time there is a change from raw foods to ready-to-eat foods
- Each time there is a change from raw fruits & vegetables to Potentially Hazardous foods
- Before using or storing a food temperature measuring device
- At any time when contamination may occurred
- If used with potentially hazardous foods, at least every 4 hours
- If used with potentially hazardous food, more than every 4 hours if:
 - Storage containers are maintained at required temperatures & cleaned and sanitized after being emptied
 - Utensils and equipment used in a refrigerated room
 - Equipment used to store packaged food

If equipment is not properly washed and sanitized then microbial contaminants will be present on these surfaces. Sanitizing with an approved chemical at the proper concentration or hot water at the proper temperature will remove approximately 90% or more of the microorganisms on a surface. Ware washing sinks may not be used for hand washing, as a utility sink, or as a food preparation sink!



Dishwashing Methods

Steps to properly wash equipment are:

1. Pre-flush scrape and soak to remove food debris
2. Wash equipment in hot soapy water
3. Rinse equipment in hot clean water to remove soap
4. Sanitize equipment in sanitizing solution with one of the sanitizing agents specified in the next section
5. Air Dry - do not towel dry!



Equipment that cannot be easily washed in a 3-bin sink or dishwasher with two drain-boards must be cleaned in place using the same steps: pre-flush, wash, rinse, sanitize and air dry.

Sanitizing Methods

Hot Water (High Temperature Sanitization)

The “plate” temperature of the hot water must be at least 160°F to disinfect surfaces, which means the thermometer on a dishwasher must indicate a temperature of about 180°F from the manifold, but may not be greater than 194°F. The “plate” water temperature of the sanitizing rinse must be checked on a daily basis by sending a water-resistant dish wash thermometer through the dishwasher, or by using other acceptable temperature measuring devices.

Chemical (Low Temperature Sanitization)

All food equipment must be sanitized after the washing steps and air dried before equipment may be used again. The following chemical sanitizing agents are approved by the Food and Drug Administration for food surfaces:

1. Chlorine is an approved sanitizing agent. As shown in the following table, chlorine concentration is dependent on the pH and temperature of the water. Household bleach contains chlorine and may be used to sanitize food equipment.

The recommended concentration for chlorine for wiping cloth solutions is 50 to 100ppm.

CHLORINE

Concentration (ppm or mg/l)	Temperature Is at least	Time (seconds)	pH
25	120°F	10	10* or less
50	75°F	10	8* or less
50	100°F	10	10* or less
100	55°F	10	10* or less

* - The pH for most public water is around 7.0.

2. Quaternary ammonia is also an approved sanitizing agent and must be used as shown in the following table:

QUATERNARY AMMONIA COMPOUND

Concentration* (ppm or mg/l)	Temperature Is at least	Time (seconds)	Water Hardness (ppm or mg/l)
200* (or specified by manufacturer)	75°F	30	500 or less

* Note: Different test strips may be required for different quaternary products that require different concentrations

3. Iodine is also an approved sanitizing agent and must be used as shown in the following table:

IODINE

Concentration (ppm or mg/l)	Temperature Is at least	Time (seconds)	pH
12.5 to 25	75°F	30	5 or less

The sanitizer concentration inside a dish wash unit must be checked daily to ensure that it is properly sanitizing all food equipment. Test strips must be used to monitor the concentrations of chlorine, quaternary ammonia and iodine sanitizing agents. Never combine different chemical sanitizers!

Wiping Cloth Sanitizing Solutions

During all hours of operation, containers of sanitizing solutions that are properly labeled for wiping cloths must be available in all work areas, including:

- Wait stations,
- Food preparation areas. And
- Dish wash areas

Wiping cloths used for wiping food spills on food contact surfaces must be stored in an approved sanitizing solution when not in use.

Mechanical Dishwashers

All mechanical dish wash units must be a commercial unit; home style units are prohibited.

- Water pressure – The water pressure in a mechanical dish wash unit must be at least 15 pounds per square inch and not greater than 25 pounds per square inch.
- Wash Solution Temperature for a Hot Water Final Rinse– The wash water temperature must be at least:
 - Stationary Rack, Single Temperature – 165°F
 - Stationary Rack, Dual Temperature - 150°F
 - Single Tank, Conveyor, Dual Temperature - 160°F
 - Multi-Tank, Conveyor, Multi-Temperature - 150°F
- Wash Solution Temperature for Chemical Sanitizing Rinse – The wash water temperature must be at least:
 - All types of mechanical dishwashers - 120°F

Dishwashing & Sanitizing – Quiz

1. Proper dishwashing procedures are:
 - a. Wash-Sanitize-Rinse-Air Dry
 - b. Rinse-Wash-Sanitize-Air Dry
 - c. Wash-Rinse-Sanitize-Towel Dry
 - d. Wash-Rinse-Sanitize-Air Dry
2. When using chlorine at a concentration of 50ppm the pH must be 8 or less and the water temperature must be 75°F or greater.
 - a. True
 - b. False
3. When using Iodine as a sanitizer the pH of the water must be 5.0 or less.
 - a. True
 - b. False
4. How long must food equipment be soaked in Iodine and Quaternary Ammonia sanitizing agents?
 - a. 10 seconds
 - b. 20 seconds
 - c. 30 seconds
 - d. 60 seconds

Notes

HAZARD ANALYSIS CRITICAL CONTROL POINTS (HACCP)

HACCP is a technique and a thought process that treats the storage, preparation and service of food as a continuous system. This system is broken down into its logical components and each is evaluated by principles of failure analysis. If each step of the process is carried out correctly, the end product will be “safe food”.

HACCP is not new. It is a process of assuring food safety that was developed in the 1960's when the National Aeronautics and Space Administration (NASA) developed HACCP to control food safety for space travelers.

There are seven steps of a HACCP system, and they include:

1. Assessment of Food Safety Hazards – Developing food flow charts (see Appendix) and identify the hazards that may be present in the food
2. Identify Critical Control Points (CCP's) –Identify points in the food process that destroy/remove the hazards that were identified in Step 1
3. Setting up Procedures for Critical Control Points – Establish steps that must be taken to implement Critical Control Points
4. Monitor Critical Control Points – Develop a monitoring system to measure Critical Control Points during the food process
5. Initiate Corrective Action – Outline corrective actions that must be taken if a Critical Control Point is not met
6. Develop a Record System – Maintain a record keeping system
7. Verify that the HACCP System works – Review and evaluate HACCP records and modify as needed

If a Person-in-Charge of a food facility is interested in developing a HACCP plan, then contact your assigned health inspector so that they may assist you with the process.

Notes

PEST CONTROL AND CHEMICALS

Pest Control

Outer openings of a FOOD ESTABLISHMENT shall be protected against the entry of insects and rodents by:

- (1) Filling or closing holes and other gaps along floors, walls, and ceilings;
- (2) Closed, tight-fitting windows; and
- (3) Solid, self-closing, tight-fitting doors.

The above excerpts are from the Coconino County Food Code and are quoted directly from the code to emphasize the approach that the County has decided to take towards pest control in the food facility. The basic approach is to **build them out**. Work to eliminate all access to the food facility by carefully locating and sealing all access points. Cockroaches have been known to enter through gaps no larger than a 1/8 inch. Mice have been known to enter gaps no larger than 1/4 inch. Insects such as cockroaches may be mechanical vectors. A mechanical vector is where an insect carries disease-causing microbes on the external parts of the insect's body.

Make sure that exterior doors to the food facility are self-closing and tight fitting. These can be access points for vermin if not properly installed. Windows should have screens of 16 mesh to every 1 inch of screen when screens are used for ventilation. Screens should be kept in good repair at all times. Screen doors must have self-closures and be kept in good repair and be tight-fitting.

The pests that plague our food facilities have something in common with us. They like the same foods. It is very important to keep our facilities as clean as possible. When we eliminate the attractant, we eliminate the pest. All food particles must be disposed of as much as possible. It does not take a great deal of food to keep a cockroach population going. Rodents require a little more, but not much more. Flies require very little. Access to stored foods must be eliminated. Rodents can chew through storage bags, as can many types of beetle and moth larvae. Foods need to be stored in pest-proof containers. Stored foods must be kept at least six (6) inches off the floor to facilitate cleaning and to prevent possible pest harborage. Cleaning must be as thorough as possible. Build up of grease and old food can keep pest populations happy for long periods of time. It also promotes large population buildups.



Food buildup such as the above situation provides a banquet for pest populations.

Common Pests in the Food Facility

The following are some of the more common pests found in food facilities. The list is just a sampling. There are many more that could be listed.

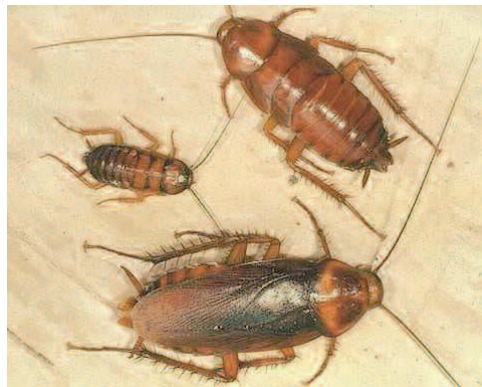
Cockroaches

Cockroaches are flattened, fast-running, nocturnal insects that seek warm, moist, secluded areas. Because of their need for high humidity they are usually not a problem at higher elevations. They can become a problem in food facilities that create artificial conditions where they can thrive. They are usually introduced via incoming food supplies and spread from storage areas into suitable harborages. They are gregarious and, because they develop from egg to adult by gradual metamorphosis, can be found together in all stages in their preferred locations. These are among the most important of pests in food facilities.

German Cockroach (*Blattella germanica*): This is the most important of the cockroach species that invades food facilities. Adults are 0.5 inch to 0.6 inch long, pale brown or tan, and have two (2) parallel dark streaks on the pronotum or area just behind the head. They have chewing mouthparts. Their movements are very rapid when they are disturbed. They are nocturnal (active at night). If a few are seen crawling around during the day then you can be sure there is a large population you are not seeing. German cockroaches are prolific and can have up to three (3) or four (4) generations per year, depending on surrounding conditions. Eggs are laid in capsules called ootheca, which are carried under the female up until a day or two (2) before the eggs are ready to hatch. The ootheca is dropped almost anywhere. There are usually 30 to 40 eggs per ootheca. During the day German cockroaches may be found under the stoves or ranges and refrigerators, and in the insulation in the walls of appliances; under sinks and especially in the “dead space” between the sink and the wall; under and behind water heaters, particularly if it is enclosed in a cabinet; in, under, or behind cabinets, pantries, and closets; behind baseboards and moldings; and in other cracks, crevices, and dark, protected areas.



American Cockroach (*Periplaneta americana*): Arguably the second most important of the cockroach species that are found in food facilities. These cockroaches grow to about two (2) inches when adults. They are red-brown in color. When the wings become fully developed they will lie completely over the abdomen. Adults can also be recognized by the yellow “halo-like” band around the edge of the abdomen. The nymphs are initially gray-brown and about 1/4 of an inch long upon emergence from the egg capsule or ootheca. As development progresses they become more red-brown and the yellow “halo” becomes more prominent. American cockroaches prefer to live in warm, damp locations and are often found around water heaters and etc. when they have invaded a food facility. In some areas of the country they have become good fliers, and often use this mode of transportation when migrating from building to building. They



are also known to invade buildings from the sewer system where they can be found in the thousands. Females can produce up to 60 egg capsules during a lifetime from which the nymphs will emerge in about 60 days. They go through the molting process 13 times before becoming adults, in about a period of 285 to 616 days. The adults live an average of 400 days.

Oriental Cockroach (*Blatta orientalis*): This particular species is usually black in color, but they can vary to a reddish-brown coloration. The females are about 1-1/2 inches long when adults and can be separated from the males by wing appearance. The wings are only stubby remnants. The males are about one (1) inch long. The nymphs are a light brown in color when they hatch, and are about 1/4 inch long. They become more red-brown as they develop, eventually turning the characteristic black color. This species prefers dark, damp, secluded places such as crawlspaces, basements, water meter boxes, and drains.

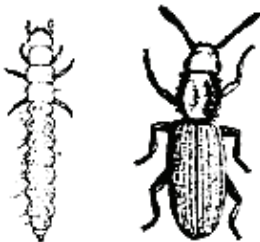


They are basically an outdoor cockroach and do very well in cold weather, especially in association with ivy, and other types of ground cover. They are often seen in the spring and early summer. The females can produce eight (8) egg capsules during a lifetime and each capsule will contain 16 eggs. The females will hide their egg capsules in secure locations within about 30 hours after they are produced. The nymphs go through about 10 molts before becoming adults. There is usually one (1) generation per year which takes about 515 days to complete at room temperature. These cockroaches are usually encountered around floor drains and etc. and are usually accidental entries into a food facility.

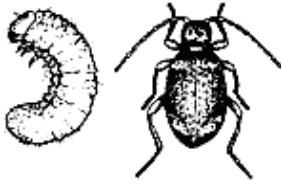
Stored Food Pests

These pests cause losses in the food facility by destroying large quantities of grain, corn, legumes (beans, lentils, peas), milled cereal products, flour, bran, macaroni and other pasta products, pet foods, dried fruits, dried vegetables, cheese, nuts, candy, and other food materials. They contaminate, and thus eliminate for human consumption, far more than they eat. Beetles and moths are mainly represented in this group.

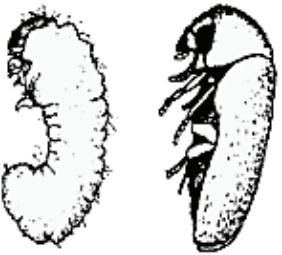
Common Stored Food Pests



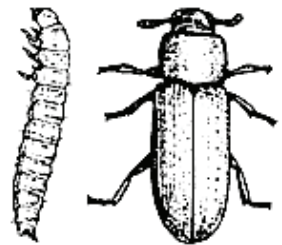
Sawtoothed grain beetles can be found in numerous food items, especially dried fruit, cereals, nuts, dried meat, macaroni, and seeds. Adults are nearly 1/8 inch long, slender, flattened, brownish-red to almost black in color, and have saw-like teeth on either side of the thorax. Larvae are cream-colored, slender, and about 1/8 inch long.



Spider beetles of several species may infest stored foods, usually dried plant products. The reddish-brown, 3/16 inch beetles have long legs and a vague, spider-like appearance. The off-white, C-shaped larvae remain in the infested material.



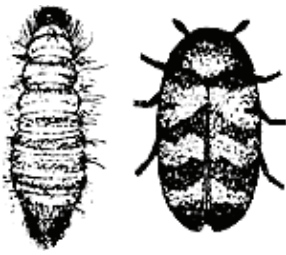
Drugstore beetles and **cigarette beetles** are about 1/8 inch long, oval, and brown. The head is bent downward giving the insect a humped appearance. Larvae are 1/8 inch long when mature, and yellowish-white with a light brown head. They have a curved body covered with fine hair. Cigarette and drugstore beetles are primarily pests of dried plant products such as spices, macaroni, dried flowers, tobacco products, and paper products, including books.



Flour beetles are 3/16 inch long, reddish-brown, and elongate oval in shape. Larvae are cylindrical, whitish, or cream-colored and up to 1/4 inch long and have 2 small pointed spines on the tail end. Two species of flour beetles may be found: red flour beetles are common in homes and the confused flour beetle is a frequent pest in flour mills. Flour beetles do not feed on whole grains but do infest flour, bran, cereal products, dried fruits, nuts, and chocolate.



Granary weevils and **rice weevils** attack only whole grains or seeds. They leave small round exit holes in kernels that were infested. Rarely are they found in nuts, dried fruits, macaroni, and caked or crusted milled products such as flour. Adult weevils are shiny dark brown and less than 3/16 inch long with a snout projecting from the head. Eggs are laid inside seeds and grains. The white, legless, wrinkled larvae are only found inside whole kernels or seeds. Similar looking though larger weevil larvae found on the floor of the house in the fall usually have emerged from acorns or hickory nuts collected and stored inside.



Warehouse and cabinet beetles are relatives of the carpet beetles. Carpet beetles are pests of stored woolen clothing or wool carpeting while cabinet and warehouse beetles may be in grain products, seeds, and dried fruits. Adult warehouse and cabinet beetles are elongate oval and 1/8 to 3/16 inch long. They may be solid black or mottled with yellowish-brown markings. Larvae are long and narrow, yellowish to dark brown and hairy. Most species grow to about 1/4 inch. If carpet beetles infest stored foods, they are likely to be in animal protein products such as dried cheese and meat.



Indian meal moths are the most common moths infesting food in the home. Moths, which may be found inside infested products or flying about the house, have a wingspan of 1/2 to 5/8 inch. The base of the front wing is pale gray or tan and the outer two-thirds is reddish-brown with a coppery luster. The wing markings are distinctive, but may not be clear if the scales have been rubbed from the wings. The larvae are off-white with shades of yellow, pink, green, or brown and grow to 1/2 inch. Only the larvae feed in infested products, which can be any dry stored food or whole grain. Foods infested with these insects will have silk webbing present on the surface of the product. Larvae often leave the food when mature and may move long distances before stopping to spin a cocoon. It is common to find caterpillars and cocoons on ceilings and walls. Adult moths may be seen for several weeks after the food source has been removed.

Filth Flies

Several kinds of non-biting flies can be found in and around food facilities. These flies can be harmful to health, causing annoyance and discomfort. All filth flies have an egg, larva (maggot), pupa, and adult stage in their life cycle. The adult fly has 2 wings (the hind pair is reduced to a knobbed balancing organ). Filth flies are usually scavengers in nature and many are capable of transmitting diseases to man. Filth flies can usually be grouped according to their habits and appearance as: houseflies and their relatives; moth flies, and fruit flies.

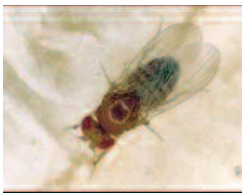


House Fly (*Musca domestica*): The house fly is one of the most common of all insects. It is worldwide in distribution and is a pest in homes, barns, poultry houses, food facilities plants, dairies, and recreation areas. It has a tremendous breeding potential and during the warmer months can produce a generation in less than two weeks. House fly eggs are laid in almost any type of warm organic material. Animal or poultry manure is an excellent breeding medium. Fermenting vegetation such as grass clippings and garbage can also provide a medium for fly breeding. The whitish eggs, which are laid in clusters of 75-100, hatch within 24 hours into tiny larvae or maggots. In four (4) to six (6) days the larvae migrate to drier portions of the breeding medium and pupate. The pupa stage may vary in length considerably, but in warm weather can be about three days. When the adult emerges from the puparium, the wings are folded in tight pads. The house fly crawls about rapidly while the wings unfold and the body dries and hardens. Under normal conditions this may take as little as an hour. Mating occurs immediately. A house fly may go through an entire life cycle; egg, larva, pupa to winged adult in six (6) to 10 days. An adult house fly may live an average of 30 days. During warm weather 2 or more generations may be produced per month. Because of this rapid rate of

development and the large numbers of eggs produced by the female, large populations build up. House flies feed by using sponging type mouthparts. As the fly moves about from one food source to another, it samples and eats its food by regurgitating liquid and dropping it on the food to liquify it. Light colored spots called fly specks are visible signs of this type of feeding. Darker fly specks associated with house flies are fecal spots. The house fly's feeding and breeding habits along with its persistence for invading food facilities and feeding on human food enable the house fly to spread many intestinal diseases such as dysentery and diarrhea.



Moth Fly (*Psychoda* and *Telmatoscopus* species): Filter/moth flies (drain flies), belong to the family of flies called moth flies. They are 1/16 to 1/18 inches in length; light gray to tan in color. Their life cycle is 7 to 20 days. Adult flies have the body and wings covered with dense, long hairs. Moth/filter flies breed in decomposing organic material, such as moist plant litter, garbage, sewage, around kitchen or bathroom sinks and water traps in plumbing fixtures.



Fruit Fly (*Drosophila* species): Fruit flies are nuisance pests and contaminators of food. Fruit flies usually breed in fruit, dirty garbage containers, or slime in drains, feeding on yeasts that grow on organic matter. Each adult lays about 500 eggs which hatch and the larvae mature to adults in 9-12 days. These flies are readily attracted to fruit, vegetables, and soda bottles and cans.

Rodents



The Deer Mouse (*Peromyscus maniculatus*) is the most commonly found mouse in food facilities in Coconino County. They fill the niche most often occupied by the House Mouse (*Mus musculus*) at lower elevations. Deer mice have white feet, usually white undersides, and brownish upper surfaces. Their tails are relatively long. The deer mouse and some other species have a distinct separation between the brownish back and white belly. Their tails are also sharply bi-colored.

In comparison to house mice, deer mice have larger eyes and ears. They are considered by most people to be more “attractive” than house mice, and they do not have the characteristic mousy odor of house mice. Deer mice are primarily seed eaters. Frequently they will feed on seeds, nuts, acorns, and other similar items that are available. They also consume fruits, insects and insect larvae, fungi, and possibly some green vegetation. They often store quantities of food near their nest sites, particularly in the fall when seeds, nuts, or acorns are abundant. In the food facility they are attracted mostly to grains and can easily tear through bags to access the contents within. Deer mice are strongly attracted to spilled flour, grains, beans, peas, nuts, and many other types of food. Keeping the facility free of food spills will serve as a deterrent to this pest species.

In mid-1993, the deer mouse was first implicated as a potential reservoir of a type of hantavirus responsible for an adult respiratory distress syndrome, leading to several deaths in the Four Corners area of the United States. Subsequent isolations of the virus thought responsible for this illness have been made from all over the United States. The source of the disease is thought to be through human contact with urine, feces, or saliva from infected rodents. It is very important that the proper precautions are

used when cleaning up deer mouse infestations. Disinfect the contaminated area with a bleach solution of one (1) part bleach to ten parts water, or use an approved commercial disinfectant. Fifteen minutes after the disinfection procedure clean the area using wet clothes, mops, and etc. Avoid any activity that would cause dust (such as sweeping, vacuuming, and etc.). It is recommended that you use a dust mask and gloves while cleaning up. Deposit everything used during cleanup in a plastic bag that is sealed and throw the bag away.

Chemical Storage

All chemicals stored in a food facility need to be stored in an area away from food preparation and food storage areas. All chemicals need to be stored in their original containers as much as possible and need to be clearly labeled as to content. Many mistakes have been made in food facilities due to improper labeling or lack of labeling of containers as to content. Never store chemicals in containers normally used for food and drink. People have been poisoned or harmed by mistaking a food container holding a chemical for a container holding a food or drink. If working containers are used containing chemicals from bulk supplies these containers need to be clearly labeled as to content (spray bottles containing a cleaner for example). Only chemicals that are required for the operation of the food facility are allowed to be stored at that facility. Chemical containers that are empty need to be disposed of properly. Never use a chemical container to store, transport, or to dispense food. Never use a food container for the storage of chemicals.

According to the Arizona Structural Pest Control Commission only certified pest control applicators, or persons directly supervised by such certified persons, may apply pesticides in or around a food facility (section 32-2228). Violation of this law results in a class 6 felony. This does not include rodent traps, such as “tin cats” or snap traps, insect and rodent glue boards. This does include different types of insecticide sprays and rodenticide baits.



There are two (2) violations in this picture. The first has to do with chemical storage. The can of insecticide is stored with food products. The second has to do with the can of insecticide itself. Since only a pest control operator is allowed to use chemical insecticides at the food facility having this can at the facility is not allowed.

Pest Control and Chemical – Quiz

1. The MOST IMPORTANT step in pest control (cockroaches, rodents, flies) is:

- 1) “Build Them Out”; “Prevent Their Entry”.
- 2) Sanitize all food contact surfaces regularly.
- 3) Keep all foods at least 6 inches off the floor.
- 4) Use the correct pesticide.

2. Which of the following cockroach pests is considered the most common:

- 1) The American Cockroach.
- 2) The Oriental Cockroach.
- 3) The Brown-Banded Cockroach
- 4) The German Cockroach.

3. Stored Food Pests are best represented by:

- 1) Synanthropic flies.
- 2) Cockroaches.
- 3) Beetles and moths.
- 4) Spiders and scorpions.

4. The most common filth fly is the:

- 1) Little House Fly.
- 2) House Fly.
- 3) Moth Fly.
- 4) Fruit Fly.

5. The rodent most often associated with hantavirus infections is the:

- 1) Deer Mouse.
- 2) House Mouse.
- 3) Sewer Rat.
- 4) Fruit Rat.

True or False

6. As long as chemicals are packaged properly it is alright to store them in food storage areas.
7. According to Arizona State Law only certified pest control applicators may apply pesticides in or around a food facility.
8. Self-closing doors are not necessary if foods are prepackaged.
9. Stored food pests contaminate far more food than they actually eat.
10. Screening for windows should be of 16 mesh to every one inch of screening in a food facility when screens are used for ventilation.

PHYSICAL FACILITIES

Facilities must be free of litter and items that are unnecessary to the operation or maintenance of the establishment, such as equipment that is non-functional or no longer used.

Animals

Live animals may not be allowed on the premises of a food facility except for:

- Service animals that are controlled by the owner, or
- Fish, such as edible or decorative fish, shellfish or crustacean in display tanks, or
- Patrol dogs accompanying police or security officers
- Pets in common areas of Group Residences not present during meal times

Backflow Prevention

A backflow prevention device must be installed between a hose bib and a faucet to prevent contaminated water from getting back into a potable water system. A backflow prevention device must be located in a place where it may be serviced and maintained.

Floors, Walls, & Ceilings

Floors – Floor surfaces in all food preparation, dish wash, food storage, and rest room areas must be designed, constructed, and installed so these surfaces are smooth, durable and easily washable. (Except that anti-slip floor coverings or applications may be used.) Permanent carpeting is not in the areas listed above, and peanut shells are prohibited anywhere in the food facility. Areas under outdoor cooking equipment, grease containers, and garbage containers must be constructed of machine-laid asphalt or concrete to facilitate cleaning of these areas.

Walls & Ceilings – Wall and ceiling surfaces in all food preparation, dish wash, and rest room areas must be finished to provide surfaces that are smooth, non-absorbent, easily washable, and light-in-color. Attachments must be easily cleanable. Studs, joists, and rafters may not be exposed in areas subject to moisture.

Junctures – All wall/wall, floor/wall, and wall ceiling junctures must be properly sealed.

Food Preparation Sinks

Food preparation sinks must be used for the washing of produce or thawing of food items. The food preparation sink must drain indirectly into the wastewater system through an air gap, and cannot be used for any other purpose.



Hand Wash Sinks

At least one hand wash sink, or a number necessary for their convenient use by employees in all food preparation and dish wash areas (Note: A rest room lavatory may not be used in lieu of a hand wash sink in a kitchen or dish wash area). A hand wash facility must be equipped to provide water at least 110°F through a mixing valve, or combination faucet. If a metered faucet is provided, then it must provide a flow of water for at least 15 seconds without the need to reactivate.



Indirect Drainage of Food Equipment

Food equipment drains including ice machines, refrigerators, and food preparation sinks must drain indirectly into the wastewater system through an air gap.

Lighting

Light Intensity – At least 10 foot-candles must be provided at a distance of 30 inches above the floor in walk-in refrigeration units and dry food storage areas. At least 20 foot-candles must be provided at:

- A surface where food is provided for customer self-service, such as buffets and salad bars
- A distance of 30 inches above the floor in areas for dish washing, hand washing, toilet rooms, equipment and utensil storage.
- At surfaces where employees prepare food or work with utensils or equipment, such as knives, slicers, grinders, or saws.

Light Shielding – Light fixtures must be properly shielded or must be shatter-resistant in areas where there is exposed food; equipment, utensils, linens, or unwrapped single-service articles.



Personal Storage

Personal items of employees must be stored in lockers, or other suitable facilities for the orderly storage of employee clothing or other personal items.

Outer Openings

Outer openings of a food facility must be protected against the entrance of pests by:

- Filling or closing holes and other penetrations along floors, walls, and ceilings,
- Installing 16 mesh screening on all window openings, and
- Installing self-closing, tight-fitting entry doors.

For deliveries, air-curtains may be installed to prevent insects from entering the facility if doors remain open for extended periods.

Utility Sinks/Lines/Floor Drains & Floor Sinks

Utility sinks – There must be at least one utility sink or curbed cleaning facility equipped with a floor drain located at the facility for the proper disposal of wastewater and for the washing of mops. This sink cannot be used for any other purpose. Maintenance tools, such as mops, brooms, etc. must be stored so they do not contaminate food, equipment, and single-service articles.

Utility Lines - Utility service lines may not be unnecessarily exposed so they do not obstruct or prevent cleaning. Utility service lines may not be installed on the floor.

Floor Drains & Floor Sinks – Must be installed so they are easily accessible for cleaning and maintenance.

Toilet Rooms

At least one toilet and one lavatory (hand sink) must be provided for employees, or what is required by a local building authority. The lavatory must be equipped to provide water at least 110°F through a mixing valve, or combination faucet. If a metered faucet is provided, then it must provide a flow of water for at least 15 seconds without the need to reactivate. Toilet rooms must be completely enclosed with self-closing entry doors, and adequately ventilated to the outdoors.



Physical Facilities – Quiz

1. Service animals are allowed in food facilities.
True False
2. Food preparation sinks:
 - a. Must drain indirectly into the wastewater system
 - b. Cannot be used for any other purpose
 - c. Must be cleaned and sanitized routinely
 - d. All of the above
3. Wall and ceiling surfaces in a kitchen or dish wash area must be:
 - a. Smooth
 - b. Easily washable
 - c. Light-in-color
 - d. All of the above
4. Only one hand wash sink is required for all types of commercial kitchens.
True False
5. The hot water temperature for a hand wash sink must be at least:
 - a. 100°F
 - b. 110°F
 - c. 115°F
 - d. 120°F
6. Light intensity for all food preparation surfaces must be at least:
 - a. 10 foot candles
 - b. 15 foot candles
 - c. 20 foot candles
 - d. None of the above
7. All entry doors must be tight-fitting and self-closing to prevent the entrance of pests.
True False
8. Toilet rooms must be:
 - a. Completely enclosed
 - b. Properly ventilated to the outdoors
 - c. Light-in-color walls and ceiling
 - d. All of the above

PLAN REVIEW PROCEDURES

Introduction

Food establishment plan review is recognized as an important food program component that allows the Environmental Health Program to ensure that food establishments are built or renovated to current regulations or rules which will eliminate code violations prior to the construction of a new facility. In order to insure that this is accomplished in the most efficient manner a plan review procedure has been developed for those interested in building new facilities, as well as for those who are interested in remodeling or making changes to their facilities. The following is a brief outline of what is required.

The Menu Packet

Plan review cannot begin until a specific menu (and specific information related to the menu) is established. Decisions about adequate refrigeration, ventilation, numbers and types of sinks, equipment location, etc. etc. etc. all begin with the menu and associated activities. It is the menu that will determine how much physical space is needed for storage, walkways, etc. etc. It is the associated activities required for the menu that determine whether or not sinks are needed for food preparations, whether or not several hand sinks will be needed, etc.

Trying to squeeze an acquired physical space to accommodate a menu is usually an exercise in designing violations of the Arizona State Food Code into an establishment. The menu, instead, determines how much space and what type of equipment will be needed. “How do I make this 3000 square foot space fit my menu...?” is the wrong question. “What will I need to have for this menu and associated activities...?” is the right question.

The “Menu Packet” has been designed to solicit this kind of information from those who are undergoing the plan review process. In filling out the packet you will recognize that much of the important information you will provide has already been covered in this manual. You will be asked for information pertaining to PHF’s (Potentially Hazardous Foods) that will be prepared and stored in your facility. The following areas of consideration are addressed when filling out the Menu Packet:

1. Facts about your establishment (name, location, owner information, hours of operation, number of seats, number of staff, types of meals, and etc.).
2. Food Preparation Review (types of PHF’s, how are they displayed, stored, etc.).
3. Food Supplies (are they from approved sources, etc.).

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4. Cold Storage (types of cold storage equipment, number, are thermometers available, and etc.).
 5. Thawing (methods to be used to thaw frozen foods safely)
 6. Cooking Equipment
 7. Hot Holding and Cold Holding Equipment
 8. Cooling (how will leftovers be cooled down for storage)
 9. Food Preparation (foods to be prepared in advance, training for employees, how ready-to-eat foods are handled, policy in dealing with sick employees, sanitation practices, pre-chilling, how produce is handled, food preparation and the temperature danger zone, and etc.).
 10. Hand Washing Facilities
 11. Food Transportation (if applicable)
 12. Customer Self-Service (if applicable)
 13. Special Food Safety Considerations (will raw or undercooked foods be served, will time alone be used as a public health control, will food be prepared for a highly susceptible population, and etc.).

This information will be used to form an approach to the building and setup of the food facility. The next step will be the preparation and submission of the food facility packet.

The Facility Packet

Those who are required to complete and submit the facility packet are as follows:

1. All new (previously unlicensed) operations (new construction &/ or “tenant-improvements).
2. All licensed operations doing alterations, remodels, additions.
3. All licensed operations with major “menu/procedure” changes that will require physical facility changes.

If in doubt, please ask. It is much better to get the right information as opposed to proceeding on a project and violating codes that will be costly in nature.

The overall time frame allowed by the Arizona State Food Code to complete a plan review is 90 days. Thirty days have been allowed for an administrative completeness review which is the time allowed for all appropriate paper work and etc. to be submitted. Sixty days have been allowed for the review itself. If turnaround time on plans is critical to your project please consider a joint review. This involves a meeting with all appropriate parties, including the “operations” persons, as well as the architect or contractor. The required forms of the packet are brought to the meeting filled out, or can be filled out at the meeting as long as the joint reviewer(s) can provide the data and be willing to sign the appropriate forms. A joint review readily speeds up the plan review process.

It is the responsibility of the applicant to conform to all applicable zoning and building requirements. The agency you contact will vary with the area you are building in. We have five different cities that we have to deal with in Coconino County (Flagstaff, Fredonia, Page, Sedona, and Williams) as well as different jurisdictions in the unincorporated areas (Coconino County Community Development; Federal or State Property Landlords). There are also Water System requirements as well as Wastewater

requirements. These are also dependent on jurisdiction. It is strongly recommended that these baseline issues be addressed before your formal submittal for health code review, in the event that any might be limiting or prohibiting to your project. A license to operate is dependent upon these issues, regardless of an otherwise successful plan review exercise.

In general, the types of information required for submittal are as follows:

1. Site Plan (if never licensed previously)
2. Floor Plan
3. Equipment Plan
4. Plumbing Plan (with water, wastewater, and gas distribution)
5. Finish Schedules (for walls, floors, ceilings, and casework)
6. Specification Sheets (on all food equipment – not just manufacturer and model numbers)

Some information on ventilation, lighting, doors and windows must be verified in the plan review process also, but these can be submitted as additional documents, or by completing the appropriate “Combination Review/Submittal” forms in the facilities packet.

When all items above have been received by our office, they will be logged in and dated on a first-come/first-serve basis. Submittals may be sent by mail, delivered in-person, or brought to a scheduled “Joint-Review” session with the plans examiner. As has been mentioned the “Joint-Review” option is preferred to expedite the review and approval process. When all the required information has been reviewed and “Approval to Construct Pending” memo is produced and delivered to the applicant and construction work can begin on the submitted project.

Construction-phase inspections can be scheduled in advance to deal with questions, unforeseen issues, or to develop checklists of work to be completed. Final inspections are required to verify code compliance and adherence to approved plans. These inspections must be scheduled a minimum of five county working days in advance. Time must be allowed to correct any possible deficiencies and to schedule required follow up inspections. For final inspections the facility must be in “turn-key” status with all the utilities approved and operable for testing of refrigeration equipment, water, ventilation, lighting, and etc. It is highly recommended that at least one operations person be present for the final inspection.

The following are some general examples of requirements in various areas of importance in the food facility. **They are not all the requirements!** The “Menu Packet” and “Facility Packet” are designed to help individuals make sense of the Arizona State Food Code. Those who are seriously contemplating the construction of a new food facility, or who are doing a major remodel need to obtain these packets and follow the instructions carefully.

Plumbing Requirements

1. Sinks

- At least one service sink for each floor level is required with hot and cold water and backflow prevention.
 - For dishwashing, at least a three-compartment sink with two drain-boards or dish tables. At least a two-compartment sink with drain boards is required for emergency backup when an operation proposes using an automatic dishwasher that will accommodate all equipment and utensils needing dishwashing. These sinks are to be used for dishwashing only!
 - Hand wash sinks, in addition to those in the restrooms, must be convenient and accessible to all food preparation, dish wash, and food-dispensing areas. The number will vary with the floor plan and layout of both equipment and activities. The sinks must be equipped with hot (110°F) and cold water and a mixing-type faucet. If the faucets are metered they must remain open a minimum of 15 seconds. These sinks can only be used for hand washing!
 - Separate food-prep sinks must be provided if the operation uses a sink to prepare food (vegetable wash, thawing, and etc.). The sinks must be indirectly connected via an air-gap and used only for food preparation!
 - Sewer-connected sinks for all outdoor cleaning if an operational requirement exists (can-wash, mats and duckboards, when a water service is provided at a solid waste storage area, and etc.).
- Note: This may or may not require a grease trap/interceptor connection depending upon jurisdiction within the County.



"Handsinks":

- all prep areas
- all dishwash areas
- all food dispensing areas
(in addition to those in restrooms)



"Service Sink":

Minimum of 1



Minimum for Dishwashing :

- 3 Compartment Sink with 2 Drainboards
- Sanitation Underwritten Equipment
- Size dependent upon the biggest items to be cleaned, & their volume.

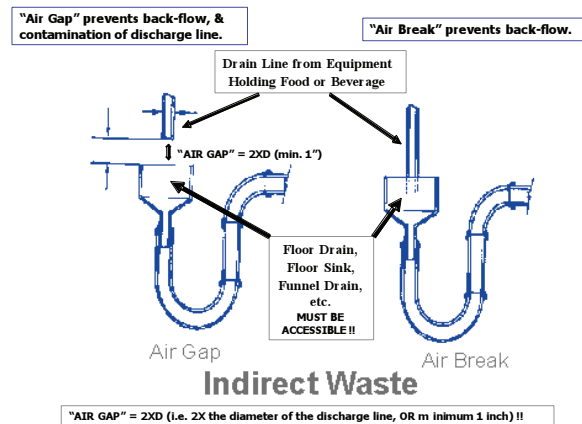


"Prep Sinks":

- "Menu-Dependent"
- Required when sink(s) used for any food prep
- Sanitation Underwritten Equipment

2. Indirect Wastes

- All equipment holding food or beverage that is equipped with a drain line must be drained indirectly to the sewer (air-gap in most cases), such as ice making and dispensing and storage equipment, condensate lines from refrigeration equipment (unless evaporative disposal of condensate), food prep sinks, beverage-making equipment, espresso machines, wok grills and etc.



- Floor sinks, floor drains, and trough drains must not be installed within walk in refrigeration units for food service applications.

3. Conduit Installation

- In restrooms, food preparation and dish wash areas, all piping must be concealed within the substructure of the building to as great an extent as possible, except for stub-outs to fixtures, unless prohibited by law (example: gas lines). Any exposed lines in these areas must be pre-approved, and will have to be a minimum of 3/4 inch away from wall and ceiling surfaces, and

- All structural penetrations by conduits that lead to inaccessible areas must be sealed; walls, ceilings, chases and etc. (escutcheon plates, trimmed foam, caulking, and etc.)

Important: The equipment schedule includes all food and beverage equipment and associated shelving, dishwashing equipment, hoods, food preparation sinks, walk in refrigeration equipment, air curtains, casework (cabinets, counters), tables and chairs, transport equipment, and etc.

- All food equipment (including hoods, walk in refrigeration units, dishwashing equipment, shelving, prep sinks, transport equipment, salad bar and buffet equipment) must be “sanitation underwritten” by an “A.N.S.I.-affiliated laboratory”.
- A “specification sheet” must be provided for each equipment item which includes a verification of “sanitation approval”.
- Any used equipment must be so identified, must be in good condition, and must meet the most-current sanitation standards (Important: alterations to equipment may result in said equipment being disapproved.)
- Any changes to equipment, if any, must be pre-approved by additional submittal and review.
- Caution: some used equipment, while previously sanitation-approved, may not meet current sanitation standards and may be rejected even though they are in good condition (examples: no galvanized hoods, refrigeration equipment that does not meet the newer 41°F product-temperature criterion, etc.)
- Caution: refrigeration equipment must be sanitation approved not only for design and construction, but also for “specific operational use” (example: most underwritten “merchandise” equipment is only approved for “pre-packaged” and or “bottled” products, not for “foodservice” applications).

[illegible]

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- Equipment such as counters, cabinets, cupboards, dining tables, and shelving not utilized for direct food contact (or closely associated contact), do not require a sanitation underwriter, but descriptive shop drawings and/or specifications must be provided to verify that design and construction provide smooth, nonabsorbent, durable, and easy-to-clean finishes when located in food preparation areas, food dispensing areas, and dish wash areas.

Floors and Baseboards Finish Schedule

In general: floors must have little or no texture and be easy to clean. Anti-slip surfaces must be appropriate to specific cleaning methodology. Washable is interpreted as being nonabsorbent and impervious to water and grease. This includes any grout. Durable is interpreted as being able to hold up to frequent cleaning, an activity-dependent criteria. All food-prep and storage areas, dish wash areas, walk in refrigeration units, restrooms, dry-goods storage areas, sink areas, or any area that is subject to frequent spillage (water, food, beverage) and/or frequent cleaning (food and beverage bars, service stations, service bars, and etc.) are subject to these criteria. The following are some acceptable finishes for floors and baseboards:

1. Kitchen:
 - Cooking: Quarry tile, poured seamless, sealed concrete
 - Food Prep: Same as above plus commercial grade vinyl composition tile
 - Bar: Same as above
 - Food Storage: Same as above plus sealed concrete, commercial grade vinyl composition tile or sheets
2. Other Storage: Same as above
3. Toilet Room: Quarry tile, poured sealed concrete, commercial grade vinyl composition tile or sheets
4. Dressing Rooms: Same as above
5. Garbage and Refuse Areas (Interior): Quarry tile, poured seamless, sealed concrete, commercial grade vinyl composition tile or sheets
6. Mop Service Area: Quarry tile, poured seamless sealed concrete
7. Ware Washing Area: Same as above plus commercial grade vinyl composition tile
8. Walk-in Refrigerators and Freezers: Quarry tile; stainless steel, poured sealed concrete, poured synthetic

Additional Floor Considerations

1. All floor coverings in food preparation, food storage, utensil-washing areas, walk in refrigeration units, dressing rooms, locker rooms, toilet rooms and vestibules must be smooth, non-absorbent, easily cleanable and durable. Anti-slip floor coverings may be used in high traffic areas only.
2. Any alternate materials not listed above must be submitted for evaluation.
3. There must be coving at base junctures that is compatible to both wall and floor coverings; recommended to provide at least 1/4 inch radius and 4 inches in height.
4. Properly installed, trapped floor drains shall be provided in floors that are water flushed for cleaning or that receive discharges of water or other fluid waste from equipment or in areas where pressure spray methods for cleaning equipment are used. Floors should be sloped to drain at least $\frac{1}{4}$ inch per

foot.

5. Grouting should be non-absorbent and impregnated with epoxy, silicone or polyurethane.
6. All walk in refrigeration units both with prefabricated floors and without, should be installed in accordance with the manufacturer's installation requirements.

Walls and Ceilings Finish Schedule

In general: walls and ceilings in food preparation areas, dish wash areas, restrooms, sink areas, food dispensing areas, and any other areas subject to splash and/or frequent cleaning (food and beverage bars, service stations, self-serve counters, and etc.) shall be smooth (little or no texture), washable (nonabsorbent, impervious to water and grease), light-colored and durable (holds up to frequent cleaning which is an activity dependent criterion). The following are some acceptable finishes for walls and ceilings:

1. Kitchen

- Cooking – Walls: Stainless steel; aluminum; Ceramic tile. Ceilings: Plastic coated or metal clad fiberboard; Dry-wall epoxy, Glazed surface; Plastic laminate.
- Food Prep – Walls: Same as above plus approved wall panels (FRP) Fiberglass Reinforced Polyester Panel; epoxy painted drywall; filled block with epoxy paint or glazed surface. Ceilings: Same as above.
- Bar – Walls: Same as above for areas behind sinks. Ceilings: Meets building codes.
- Food Storage – Walls: Approved wall panels (FRP) Fiberglass Reinforced Polyester Panel; epoxy painted drywall; filled block with epoxy paint or glazed surface. Ceilings: Acoustic tile; painted sheetrock.

2. Other Storage – Walls: Painted sheetrock. Ceilings: Same as above.

3. Toilet Room – Walls: Approved wall panels (FRP) Fiberglass Reinforced Polyester Panel; epoxy painted drywall; filled block with epoxy paint or glazed surface. Ceilings: Plastic coated or metal clad fiberboard; drywall with epoxy; glazed surface; plastic laminate.

4. Dressing Rooms – Walls: Painted sheetrock. Ceilings: Same as above plus painted sheetrock

5. Garbage and Refuse Areas (Interior) – Walls: Approved wall panels (FRP) Fiberglass Reinforced Polyester Panel; epoxy painted drywall; filled block with epoxy paint or glazed surface. Ceilings: Plastic coated or metal clad fiberboard; drywall with epoxy; glazed surface; plastic laminate.

6. Mop Service Area – Walls: Same as above. Ceilings: Same



as above.

7. Ware Washing Area – Stainless steel; aluminum; approved wall panels (FRP) Fiberglass Reinforced Polyester Panel; epoxy painted drywall; filled block with epoxy paint or glazed surface. Ceilings: Same as above
8. Walk in Refrigerators and Freezers – Walls: Aluminum; stainless steel; enamel coated steel (or other corrosion resistant material). Ceilings: Aluminum; stainless steel; enamel coated steel (or other corrosion resistant material).

Additional Wall Considerations

1. The walls, including non-supporting partitions, wall coverings and ceilings of walk in refrigeration units, food preparation areas, equipment washing and utensil washing areas, toilet rooms and vestibules shall be smooth, non-absorbent and capable of withstanding repeated washings. Light colors are recommended for walls and ceilings. Studs, joists and rafters shall not be exposed in walk in refrigeration units, food preparation areas, equipment washing and utensil washing areas, toilet rooms and vestibules. Where permitted to be exposed, studs, joists and rafters must be finished to provide an easily cleanable surface.
2. All alternate materials not listed must be submitted for evaluation.
3. Glazed surfaces should be glazed block, or brick or ceramic tile. Grouting must be non-absorbent and impregnated with epoxy, silicone, polyurethane or an equivalent compound. Concrete block, if used, must be rendered non-porous and smooth by the application of approved block filler followed by the application of an epoxy-type covering or equivalent. All mortar joints shall be only slightly tooled and suitably finished to render them easily cleanable.
4. Plastic laminated panels may find applications but are not recommended. Joint finishes should be compatible with the wall structure. Voids should be eliminated at joints.

Additional Ceiling Considerations

1. Finishes shall be light-colored, smooth, non-absorbent and easily cleanable. Acoustical material free of porous cloth or sponge may be used, provided ventilation is adequate to minimize soiling.

Lighting Schedule

1. Intensity

- Enough artificial lighting shall be installed to provide a minimum of 20 foot candles (220 lux) upon all customer service areas; inside equipment such as reach in refrigerators and under counter refrigerators; at a distance 30 inches from the floor in areas where there is hand washing, food preparation, dish washing, and equipment and utensil storage; at a distance 30 inches from the floor in restrooms.
- Enough artificial lighting shall be installed to provide a minimum of 20-50 foot candles (220-540 lux) in areas where an employee is working with food and/or safety is an issue.
- Enough artificial lighting shall be installed to provide a minimum of 10 foot candles (110 lux) at a distance 30 inches from the floor in walk in refrigeration units, dry food storage areas, and all other areas and rooms not referenced above during periods of cleaning.
- In “Bars”, at least 20 foot candles of light upon all surfaces (hand sinks, dish wash sinks, jockey boxes, and etc.) may be provided without lighting the entire bar area, as long as a minimum of 10 foot candles is provided for periods of cleaning.

2. Shielding

- Light bulbs shall be shielded, coated, or otherwise shatter-resistant in areas where there is exposed food, clean equipment, utensils and linens; or unwrapped single-service and single-use articles.
- The above includes light fixtures within food equipment such as salad bars, produce display, refrigeration units, deli cases, and etc.
- It is not required where such items are packaged, if the packaging will prevent broken glass contamination and can be cleaned when exposed to broken glass before the package is opened.

3. Clean Ability

- Light fixtures in food preparation and dish wash areas must be of a design, construction and installation that is easy to clean.



Ventilation

Important: For most properties within Coconino County, there is a Building Department jurisdiction which will do a complete Uniform Mechanical Code (UMC) review, and the health code review will only overlap in certain specific areas. Decisions about whether or not a hood will be required, what type of hood is required, mechanical requirements, and etc. will remain a function of Building Department review. All rooms from which obnoxious odors, vapors, or fumes originate shall be mechanically vented to the outside air.

1. Restrooms must be mechanically exhausted directly to the outside air.
2. Cooking Equipment:
 - Equipment such as stoves, grills, griddles, fryers, broilers, smokers, and etc. will generally require a hood.
 - Determination about “fire suppression” systems will generally be made by building departments, fire departments, or State Fire Marshall depending upon location and assigned jurisdiction.
3. Dish Washers:
 - “Condensate/Vapor Hoods” will generally be required for “high-temperature” automatic dish washers.
4. Sanitation Underwriter:
 - Hoods must be “sanitation-underwritten” by an “A.N.S.I.-affiliated laboratory”; “specification sheets” must be submitted which verify the sanitation approval.

Door Requirements

1. Exterior Doors:
 - Must be “tight-fitting” (no light shines through), and “self-closing” unless other pre-approved

-
- insect and rodent control barriers are provided.
- Door surfaces exposed to the interior of kitchens and restrooms must be smooth-faced, easy-to-clean, and washable.
 - When exterior screen doors are utilized for insect and rodent control, the screening must be no less than 16 grid per square inch.
 - “Emergency Exit” doors must be tight-fitting, but the self-closing requirements may be waived if said door is always connected to an alarm system.
 - “Double” exterior doors must be tight-fitting, but the self-closing requirement may be waived for one of the two doors if said door is not routinely operated and is dead-bolted except for short periods of temporary use.
 - “Rollup” exterior doors must be tight-fitting when in the closed position, but the self-closing requirement may be waived if said doors are not open frequently or for extended periods of time.

2. Interior Doors:

- Restroom doors must be self-closing.
- All door surfaces exposed to the interior of a kitchen or a restroom must be smooth-surfaced, easy-to-clean, and washable.
- Interior doors must be equipped as for an “exterior door” when they open into associated structures/spaces that are not insect and rodent proofed.

3. Air Curtains and Other Insect/Rodent Control Methodologies:

- Must be sanitation underwritten, and are supplementary only to the above-noted requirements.
- Any other proposed methods for insect and rodent control must be pre-approved.

Window Requirements

1. Exterior Windows:

- Must be “tight-fitting” (no light shines through), and either “screened” or “self-closing”.
- Window surfaces exposed to the interior of kitchens and restrooms must be smooth-surfaced, easy-to-clean, and washable.
- Window screens must be no less than 16 grid per square inch.

2. Interior Windows:

- Window surfaces exposed to the interior of a kitchen or a restroom must be smooth-surfaced, easy-to-clean, and washable.
- Must be equipped as for an “exterior window” when they open into associated structures/spaces that are not insect and rodent proofed.

3. Air Curtains and Other Insect/Rodent Control Methodologies:

- Must be sanitation underwritten, and are supplementary only to the above-noted requirements.
- Any other proposed methods for insect and rodent control must be pre-approved.

Mobile Food Units, Push Carts and Food Peddlers

Mobile Food Units, Push Carts and Food Peddler guidelines are available through our office. They must be constructed and operated in full accordance with the Coconino County Food Code. All units must be permitted through the County's Environmental Health Program. They must operate out of an approved commissary. If you are interested in operating any of these units in Coconino County please contact our office.

Plan Review Procedures – Quiz

1. Which of the following items is not affected by the menu:
 - 1) Requirements for adequate refrigeration.
 - 2) Numbers and types of sinks.
 - 3) Interior color of the dining room.
 - 4) Physical space requirements for storage.
2. The minimum number of hand sinks required in a food facility is:
 - 1) One.
 - 2) Two.
 - 3) Three.
 - 4) None are required.
3. Which of the following sinks requires an indirect connection:
 - 1) Hand sink.
 - 2) Mop sink.
 - 3) Food preparation sink.
 - 4) Three compartment sink.
4. Which of the following items would NOT have to be NSF approved in the food facility:
 - 1) Three compartment sink.
 - 2) Food storage shelves.
 - 3) Food mixer.
 - 4) Toilet fixture.
5. The overall time frame allowed by the Coconino County Food Code to complete a plan review is:
 - 1) 30 days.
 - 2) 60 days.
 - 3) 90 days.
 - 4) As long as it takes.

True or False

6. Alterations to a food establishment, such as a remodel or renovation, require plan review and pre-approval by the Health Department before construction work begins.
7. A joint review is required as part of the plan review process.
8. Once the "Approval to Construct Pending" memo is received construction work can begin on the new food facility.

INDEX

- Animals 4, 7, 18, 20, 21, 27, 32, 33, 34, 51, 66, 87
Backflow prevention 87, 94
Beetles 81, 82, 83, 86
Buffets/salad bars 51, 88
Bulk dispensing 51
Campylobacter jejuni 15, 21
Chemical storage 85
Chlorine 31, 33, 72, 73, 75
Class 3 Misdemeanor 38
Clostridium botulinum 8, 10, 15, 18, 45
Clostridium perfringens 15, 20
Cockroaches 79, 80, 81
Cold Holding 92
Consumer Advisory 25, 30, 31, 49
Cooking Temperatures 20, 35, 49
Cooling methods 59
Critical violations 38, 39
Cross contamination 63, 64, 66, 67, 68
Cryptosporidium parvum 15, 33
Date marking 46
Demonstration of Knowledge 41
Dented cans 48
Equipment materials 55
Escherichia coli 0157:H7 15, 24, 42
Exclusions/Restrictions 42
Facility packet 92, 93
Fingernails 59, 61
Flies 21, 27, 51, 79, 83, 84
Food equipment certification 55
Food preparation sinks 88, 96
Food protection 1, 7, 51
Food sources/condition
Giardia lamblia 15, 32
Hair restraints 59, 61
Hand washing 26, 27, 28, 30, 59, 60, 71, 88, 92, 94, 99
Hepatitis A 15, 29, 30, 31, 42
Highly Susceptible Groups 49
Hot Holding 49, 92
Indirect drainage 88
Inspection frequency 38
Iodine 33, 73
Jewelry 59, 61
Lighting 39, 88, 93, 99
Listeria monocytogenes 15, 25
meat storage
Mechanical dishwashers 74
Menu packet 91, 93
Mice 32, 79, 84
Microwave cooking/reheating 49
Moths 81, 83
non-critical violations 38, 39
Norovirus 15, 31, 42
Outer openings 79, 89
Personal storage 88
Plumbing requirements 94
Potentially hazardous food 8, 9, 10, 16, 18, 20, 27, 37, 38, 45, 46, 48, 49, 51, 71, 91
Quaternary ammonia 73
Ready-to-Eat Food 10, 23, 31, 35, 46, 51, 63, 64, 66, 67, 71, 92
Receiving temperatures 47
Reheating 20, 49, 50
Reporting communicable diseases 41
Salmonella 15, 27, 49
Sanitizers 8, 60, 73
Service animals 66, 87
Shellfish tags 48
Shigella 15, 26, 42
Staphylococcus aureus 15, 28
Temperature Danger Zone 46, 48, 49, 65, 92
Thawing 48, 88, 92, 94
Thermometer calibration 47
Toilet rooms 56, 88, 89, 97, 98
Trichinella spiralis 15, 34
Utility sinks 89
Ventilation requirements 100
Vibrio cholerae 22, 23
Vibrio parahaemolyticus 15, 23
Walls/floors/ceilings 87
Wiping cloths 7

Notes



ANSWERS TO QUIZZES

1. Diseases – Quiz	106
2. Licenses / Inspections / Enforcement – Quiz	107
3. Food Management Responsibilities – Quiz	107
4. Food Controls – Quiz	108
5. Food Equipment – Quiz	109
6. Employee Hygiene – Quiz	110
7. Cross Contamination – Quiz	111
8. Dishwashing and Sanitizing – Quiz	112
10. Pest Control and Chemicals – Quiz	113
11. Physical Facilities – Quiz	114
12. Plan Review Procedures – Quiz	115

1. Diseases – Quiz

1. Is food borne illness life threatening?
Yes
2. What groups of people are considered high risk?
Immunocompromised/Elderly/Preschoolers/Pregnant Women
3. What types of foods do pathogenic bacteria grow and multiply in?
Potentially hazardous foods (PHFs), which have water activities of $> 0.85\%$ and $pH > 4.6$
4. Is cooked rice a potentially hazardous food?
Yes
5. How can botulism poisoning be prevented?
Do not use PHFs from: damaged hermetically sealed cans, or home canned food.
6. What type of foods are Campylobacter and Salmonella associated with, and how can these disease-causing organisms be destroyed?
Poultry – cook poultry to 165°F for 15 seconds
7. What is the primary prevention of Cholera?
Properly treat drinking water
8. What is the primary reservoir of Escherichia coli 0157:H7, and how can this disease-causing organism be destroyed?
Beef – cook ground beef to 155°F for 15 seconds and sear the outsides of steaks to 145°F
9. How can the spread of the disease Shigellosis be prevented during food preparation?
Properly wash hands
10. What is the primary source of Staphylococcal food poisoning, and how can this disease be prevented?
Humans – proper cold and hot holding temperatures, and proper cooling
11. Can viral infections be treated with antibiotics?
No
12. How is Hepatitis A transmitted?
Fecal/oral route
13. How can the spread of Norovirus be prevented?
Proper hand washing and proper sanitizing of food and non-food contact surfaces
14. What are the two primary organisms of concern for water borne disease?
Giardia and Cryptosporidium

2. Licenses / Inspections / Enforcement – Quiz

1. Health licenses are transferable.
 - a. True
 - b. *False*
2. All violations of the Food Code are Class 3:
 - a. *Misdemeanors*
 - b. Felonies
 - c. All of the above
 - d. None of the above
3. Critical violations must be corrected within or sooner:
 - a. 20 days
 - b. 15 days
 - c. *10 days*
 - d. 5 days
4. A food facility must close immediately if an imminent health hazard exists.
 - a. *True*
 - b. False

3. Food Management Responsibilities – Quiz

1. Demonstration of Knowledge includes:
 - a. Compliance with the Food Code during a health inspection
 - b. Food Managers are certified through this food safety course
 - c. Correctly answering questions that pertain to the food facility during a health inspection
 - d. *All of the above*
2. An employee must report to the manager if he/she has:
 - a. Vomiting
 - b. Diarrhea
 - c. Fever
 - d. Jaundice
 - e. *All of the above*
3. The four high risk groups are:
 - a. *Elderly*
 - b. *Preschoolers*
 - c. *Immunocompromised*
 - d. *Pregnant women*
4. Food handlers with communicable diseases must be excluded or restricted from a food operation in accordance with the Arizona Administrative Code.
 - a. *True*
 - b. False

4. Food Controls – Quiz

1. How many days can potentially hazardous foods (commercially prepared and/or prepared onsite) that are ready to eat be stored in the refrigerator?
 - a) For 4 days if held at 45°F or less.
 - b) For 7 days if held at 41°F or less.
 - c) Both A and B are correct.**
 - d) None of the above are correct.
2. Which of the following methods is acceptable for handling ready to eat foods?
 - a) With bare hands, provided they are clean.
 - b) With single-use, non-latex gloves.
 - c) With suitable utensils (spatulas, tongs, etc.).
 - d) Both b and c are correct.**
3. Which of the following foods is NOT considered potentially hazardous?
 - a) Cooked Vegetables
 - b) Meat and dairy products
 - c) Lettuce**
 - d) Sprouted Seeds
4. Raw ground beef must be cooked to what internal temperature?
 - a) 110°F
 - b) 145°F
 - c) 155°F**
 - d) 165°F
5. Processed foods like hot dogs do not have a required cooking temperature, they must only be served warm.
 - a. True
 - b. False**
6. What are the two components to satisfactory compliance with a consumer advisory?
 - a) Disclosure and Abatement
 - b) Disclosure and Reminder**
 - c) Reminder and Notice
 - d) None of the Above
7. What is the safest thawing method?
 - a) Thawing In the refrigerator**
 - b) Thawing in a food preparation sink under cool (70°F or less) running and draining water
 - c) Thawing by cooking from a frozen state or microwave as part of a continuous cooking process.
 - d) Thawing in the open air at room temperature
8. What is the cooking temperature of chicken and other poultry?
 - a) 130°F
 - b) 145°F
 - c) 155°F
 - d) 165°F**
9. If you cool in the refrigerator or freezer, what is the maximum depth that the food can be in the container?
 - a) 1 foot
 - b) 6 inches
 - c) 2 inches**
 - d) 8 inches
10. It is legal to prepare food in the home, bring it to a restaurant and sell it.
 - a. True
 - b. False**
11. Consumers may re-use soiled plates at a buffet.
 - a. True
 - b. False**

5. Food Equipment – Quiz

1. Home style equipment, such as refrigerators may be used in a food operation.
 - a. True
 - b. False*
2. Wooden cutting boards must be constructed of:
 - a. Pine
 - b. Birch
 - c. Maple*
 - d. All of the above
3. Opened hermetically sealed metal food containers may be reused:
 - a. True
 - b. False*
4. NSF stamps on food service equipment stands for:
 - a. National Science Foundation
 - b. National Sanitation Foundation*
 - c. National Safety Foundation
 - d. National Service Foundation

6. Employee Hygiene – Quiz

1. On a day-to-day basis, the primary way that food handlers contaminate food is by:
 - a. *Not washing hands,*
 - b. Eating and drinking around food and clean equipment and
 - c. Coming to work ill with symptoms, such as diarrhea, vomiting wound infections and nose discharges.
 - d. Not wearing clean clothes,
2. What temperature must the water be to wash hands?
 - a. 100°F
 - b. *110°F*
 - c. 120°F
 - d. None of the above
3. Bar soap may be used to wash hands.
 - a. True
 - b. *False*
4. The only acceptable jewelry that may be worn by a food handler is:
 - a. Watch
 - b. *Plain wedding band*
 - c. Diamond ring
 - d. All of the above
5. Hair restraints are not required for beards.
 - a. True
 - b. *False*
6. Food handlers may use which of the following to handle ready-to-eat food:
 - a. Deli tissues
 - b. Tongs
 - c. Disposable gloves
 - d. *All of the above*
7. What type of material may not be used for disposable gloves in a food operation?
 - a. *Latex*
8. A Ready-to-Eat Food is a food that is not cooked prior to serving immediately.
 - a. *True*
 - b. False
9. False nails are not allowed to be worn by food handlers.
 - a. True
 - b. *False*
10. How long must you lather your hands?
 - a. 10 seconds
 - b. *20 second*
 - c. 30 seconds

7. Cross Contamination – Quiz

1. Which one of the following would MOST likely cause serious bacterial contamination?
 - 1) A flour or ice scoop.
 - 2) A salt or pepper shaker.
 - 3) A deep-grease fryer.
 - 4) *A meat-slicer or cutting board.*
2. An example of PROPER vertical food storage is:
 - 1) Raw chicken over raw ground beef.
 - 2) Raw ground beef over lettuce.
 - 3) *Cooked chicken over raw ground beef.*
 - 4) Raw fish over jello dessert.
3. Cross contamination may occur when:
 - 1) Disposable gloves are not changed as needed.
 - 2) Hands are not washed as needed.
 - 3) Utensils are not washed and sanitized between uses.
 - 4) *All of these.*
4. The main way to cross contaminate food is:
 - 1) Food to food.
 - 2) People to food.
 - 3) Equipment to food.
 - 4) *All of these.*
5. An example of a ready-to-eat food is:
 - 1) A fried hamburger.
 - 2) Scrambled eggs.
 - 3) A three-cheese casserole.
 - 4) *A donut.*

True or False

6. HANDS are probably the most common way food handlers contaminate food and food contact surfaces.
True
7. The Coconino County Food Code calls for all raw animal foods to be separated from all ready-to-eat foods.
True
8. Raw chicken should ALWAYS be stored above ground beef.
False
9. Foods should be stored at least six inches off the floor to avoid contamination.
True
10. The “Bare Hand Contact” rule applies only to employees that have used the restroom.
False

8. Dishwashing and Sanitizing – Quiz

1. Proper dishwashing procedures are:
 - a. Wash-Sanitize-Rinse-Air Dry
 - b. Rinse-Wash-Sanitize-Air Dry
 - c. Wash-Rinse-Sanitize-Towel Dry
 - d. *Wash-Rinse-Sanitize-Air Dry*
2. When using chlorine at a concentration of 50ppm the pH must be 8 or less and the water temperature must be 75°F or greater.
 - a. *True*
 - b. False
3. When using Iodine as a sanitizer the pH of the water must be 5.0 or less.
 - a. *True*
 - b. False
4. How long must food equipment be soaked in Iodine and Quaternary Ammonia sanitizing agents?
 - a. 10 seconds
 - b. 20 seconds
 - c. *30 seconds*
 - d. 60 seconds

10. Pest Control and Chemicals – Quiz

1. The MOST IMPORTANT step in pest control (cockroaches, rodents, flies) is:

- 1) *"Build Them Out"; "Prevent Their Entry".*
- 2) Sanitize all food contact surfaces regularly.
- 3) Keep all foods at least 6 inches off the floor.
- 4) Use the correct pesticide.

2. Which of the following cockroach pests is considered the most common:

- 1) The American Cockroach.
- 2) The Oriental Cockroach.
- 3) The Brown-Banded Cockroach
- 4) *The German Cockroach.*

3. Stored Food Pests are best represented by:

- 1) Synanthropic flies.
- 2) Cockroaches.
- 3) *Beetles and moths.*
- 4) Spiders and scorpions.

4. The most common filth fly is the:

- 1) Little House Fly.
- 2) *House Fly.*
- 3) Moth Fly.
- 4) Fruit Fly.

5. The rodent most often associated with hantavirus infections is the:

- 1) *Deer Mouse.*
- 2) House Mouse.
- 3) Sewer Rat.
- 4) Fruit Rat.

True or False

6. As long as chemicals are packaged properly it is alright to store them in food storage areas.

False

7. According to Arizona State Law only certified pest control applicators may apply pesticides in or around a food facility.

True

8. Self-closing doors are not necessary if foods are prepackaged.

False

9. Stored food pests contaminate far more food than they actually eat.

True

10. Screening for windows should be of 16 mesh to every one inch of screening in a food facility when screens are used for ventilation.

True

11. Physical Facilities – Quiz

1. Service animals are allowed in food facilities.
True *False*
2. Food preparation sinks:
 - a. Must drain indirectly into the wastewater system
 - b. Cannot be used for any other purpose
 - c. Must be cleaned and sanitized routinely
 - d. All of the above*
3. Wall and ceiling surfaces in a kitchen or dish wash area must be:
 - a. Smooth
 - b. Easily washable
 - c. Light-in-color
 - d. All of the above*
4. Only one hand wash sink is required for all types of commercial kitchens.
True *False*
5. The hot water temperature for a hand wash sink must be at least:
 - a. 100°F
 - b. 110°F*
 - c. 115°F
 - d. 120°F
6. Light intensity for all food preparation surfaces must be at least:
 - a. 10 foot candles
 - b. 15 foot candles
 - c. 20 foot candles*
 - d. None of the above
7. All entry doors must be tight-fitting and self-closing to prevent the entrance of pests.
True *False*
8. Toilet rooms must be:
 - a. Completely enclosed
 - b. Properly ventilated to the outdoors
 - c. Light-in-color walls and ceiling
 - d. All of the above*

12. Plan Review Procedures – Quiz

1. Which of the following items is not affected by the menu:
 - 1) Requirements for adequate refrigeration.
 - 2) Numbers and types of sinks.
 - 3) *Interior color of the dining room.*
 - 4) Physical space requirements for storage.
2. The minimum number of hand sinks required in a food facility is:
 - 1) One.
 - 2) *Two.*
 - 3) Three.
 - 4) None are required.
3. Which of the following sinks requires an indirect connection:
 - 1) Hand sink.
 - 2) Mop sink.
 - 3) *Food preparation sink.*
 - 4) Three compartment sink.
4. Which of the following items would NOT have to be NSF approved in the food facility:
 - 1) Three compartment sink.
 - 2) Food storage shelves.
 - 3) Food mixer.
 - 4) *Toilet fixture.*
5. The overall time frame allowed by the Coconino County Food Code to complete a plan review is:
 - 1) 30 days.
 - 2) 60 days.
 - 3) *90 days.*
 - 4) As long as it takes.

True or False

6. Alterations to a food establishment, such as a remodel or renovation, require plan review and pre-approval by the Health Department before construction work begins.
True
7. A joint review is required as part of the plan review process.
False
8. Once the “Approval to Construct Pending” memo is received construction work can begin on the new food facility.
True
9. If your hand sink breaks down it is permissible to use your food preparation sink as a hand sink until repairs can be initiated.
False
10. Door surfaces exposed to the interior of kitchens and restrooms must be smooth-faced, easy-to-clean, and washable.
True

Notes

Personal health and hygiene of the food worker, and rigid temperature controls on food, are among the most important considerations in insuring a safe food product.

Temperature requirements for potentially hazardous foods are based upon the knowledge of BACTERIA. Bacteria DO NOT GROW WELL when the temperature falls below 41_F and begin to die rapidly when the temperature rises above 140_F.

It would be difficult to prepare foods without some bacterial contamination occurring. Contaminated foods, if allowed to remain at room temperatures for extended periods of time, WILL cause illness. While food is being prepared at room temperature, the quantities need to be limited to complete preparation within a safe one-hour or less time period.

It is the responsibility of the food establishment operator to assure that food handling methods incorporate steps that will maintain adequate food temperature control.

Food-borne illness investigations have revealed that “inadequate temperature control” is the largest factor in causing outbreaks of illness.

BACTERIA IN FOOD CAN BE CONTROLLED WITH PROPER TEMPERATURES !!!

Bd/cchd/5-04

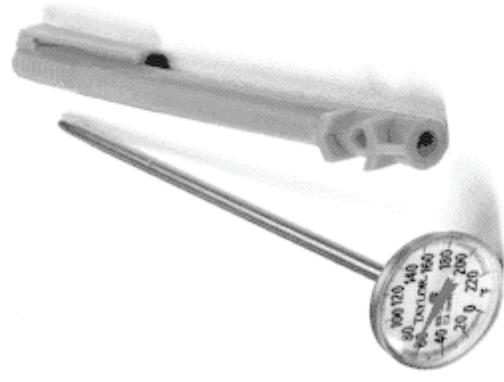


ENVIRONMENTAL HEALTH
SERVICES

2500 North Fort Valley Rd.
Building No. 1
Flagstaff, Az. 86001

(928)226-2741
(928)226-2711 fax

TEMPERATURE CONTROL REQUIREMENTS FOR SAFE FOOD



RECEIVING-STORAGE
(INCLUDES DISPLAY)

41°F IF REFRIGERATED
140°F IF HOT-HOLDING
FROZEN IF FROZEN

REHEATING

165°F, ASAP, BUT WITHIN 2 HOURS

DO NOT USE TO REHEAT:
CROCKPOTS, STEAM TABLES, &
BAINMARIES (USE THESE ONLY FOR
HOT-HOLDING)

THAWING

1. UNDER REFRIGERATION
(BEST);
2. UNDER COLD RUNNING &
DRAINING WATER IN A
CLEAN SINK;
3. MICROWAVE OVEN**
4. COOK FROM FROZEN STATE**

** = AS PART OF A CONTINUOUS
COKING PROCESS ONLY !!

Temperatures are “Actual Product
Temperatures”, taken internally with a
probe thermometer ! ! ! !

COOLING HOT FOOD

FROM 140°F...

TO 45°F OR LESS WITHIN 4 HOURS,
OR
TO 70°F WITHIN 2 HOURS, THEN TO
41°F OR LESS WITHIN 4 HOURS

Suggestions:

Small Quantities Cool Faster
Shallow Pans
Frequent Stirring
Pack Container In Ice Bath
Put Container In Cold-Water Bath
Add Ice To Food
Blast-Chiller Equipment

TRANSPORTATION

FROZEN IF FOODS ARE FROZEN
41°F IF REFRIGERATED FOODS
140°F IF HOT-HELD FOODS

Note:

See Food Code for possible exception
when using “time-only” as the public
health control (requires date-marking,
written SOP’s, time-temperature logs,
AND automatic discarding of food).

FOODS; &
FRUITS & VEGETABLES FOR
HOT-HOLDING

145°F: CUSTOMER-ORDER SHELL
EGGS; & SOLID PIECES OF
FISH, BEEF, PORK

155°F: RATITES, INJECTED MEATS;
& COMMINUTED FISH, BEEF,
PORK; AND GAME MEAT[♦]

165°F: POULTRY; STUFFED
FISH, MEAT, RATITIES,
PORK, OR POULTRY; &
STUFFINGS CONTAINING
FISH, MEAT, PORK, POULTRY,
OR RATITES

130°F: WHOLE INTACT BEEF & PORK
ROASTS FOR 121 MINUTES[♦]

[♦] = SEE FOOD CODE FOR OTHER
TEMPERATURES WITH
DIFFERENT TIME FRAMES

IMPORTANT ! ! ! !:

See the Food Code for additional
“TIME-TEMPERATURE”
information not included in this
brochure.

COOKING

MINIMUM FOOD TEMPERATURES
FOR AT LEAST 15 SECONDS:

140°F: COMMERCIALLY-PACKAGED

SMOKE-FREE ARIZONA ACT



FOR MORE INFORMATION

Arizona Department of Health Services
Office of Environmental Health
(602) 364-3122

Smoke-Free Arizona Information Line
1-877-AZSTOPS
1-877-297-8677

Smoke-Free Arizona Website
www.smokefreearizona.org

E-mail
smokefreearizona@azdhs.gov



Tobacco Use
Prevention Project

Marty Eckrem, M.P.H.
Program Manager

2625 North King Street
Flagstaff, AZ 86004-1884
928-522-7884
Fax 928-522-7186
meckrem@coconino.az.gov
www.coconino.az.gov/health



RATIONALE

Protect patrons, employees and people who may be particularly vulnerable to the health risks associated with breathing secondhand tobacco smoke by prohibiting smoking in enclosed public places and places of employment.

SMOKE FREE PLACES INCLUDE

All enclosed areas in public places and places of employment, including restaurants and bars

PLACES WHERE SMOKING IS ALLOWED

- Private residences (except when used as a licensed child care, adult day care, or health care facility)
- Hotel and motel rooms designated as smoking rooms (no more than fifty percent of rooms rented to guests in a hotel or motel are so designated)
- Retail tobacco store (physically separated and independently ventilated so that smoke from retail tobacco stores does not infiltrate non-smoking areas)
- Veterans and fraternal clubs when they are not open to the general public
- Smoking when associated with religious ceremony practiced pursuant to the American Indian Religious Freedom Act of 1978
- Outdoor patios so long as tobacco smoke does not enter areas where smoking is prohibited through entrances, windows, ventilation systems, or by other means
- Theatrical performance upon a stage or in the course of a film production or television production if the smoking is part of the performance or production

BUSINESS OWNER'S RESPONSIBILITIES

- Post "No Smoking" signs that include the contact information for reporting violations
- Remove ashtrays and other smoking receptacles from non-smoking areas
- Inform employees about the new law (existing employees and future employees)
- Prohibit anyone from smoking inside place of business. This includes employees, vendors and customers

VIOLATIONS AND PENALTIES

- Complaints will be investigated by county health departments. If a violation is found, the business owner will receive a warning letter.
- Subsequent violations may be punishable up to \$500 for each violation. Each day a violation occurs constitutes a separate violation. If the superior court finds that violations are willful or there is evidence of a pattern of noncompliance, the court may impose a fine up to \$5,000 per violation.

SMOKE-FREE ARIZONA COMPLIANCE CHECK LIST...GET READY FOR MAY 1, 2007!

Businesses (Public Places and Places of Employment)

The purpose of the Smoke-Free Arizona Act is to protect Arizonans from the harmful effects of second-hand smoke in enclosed public places and places of employment, except those that meet exemption criteria.

Remove all indoor ashtrays and smoking receptacles and move all outdoor ashtrays and smoking receptacles to at least 20 feet away from doors, from windows capable of being opened, and ventilation systems, unless ashtrays are on your outdoor patio where you allow smoking.

Post "no smoking" signs at all entrances, with the exception of emergency exits and door(s) leading out to outdoor patio(s). Signs must be posted in a conspicuous area visible from the outside of the establishment.

Make sure all "no smoking" signs have the required information:

- International no smoking symbol or the words "no smoking"
- A citation to A.R.S. § 36-601.01
- The telephone number for making complaints (1-877-4-AZNOSMOKE, 1-877-429-6676)
- The website address for making complaints (www.smokefreearizona.org)

Make sure the signs are the appropriate size:

- No smaller than 4"x6" for signs posted at entrances of enclosed public places and non-vehicle places of employment
- No smaller than 2"x3" for signs posted in vehicle places of employment

Educate all current and prospective employees about the requirements of the Law (i.e. payroll stuffers via inserts, staff meetings, e-mails, break room posters, etc...). Employees must know what is expected of them.

Prohibit smoking in all non-smoking areas, including enclosed areas and areas within 20 feet of the entrances (except for patios).

Proprietors may choose to designate patios for smoking that meet the requirements of A.R.S. § 36-601.01 R9-2-108(A) for smoking. In these cases, ensure that any outdoor patios are managed so that smoke does not enter into the establishment and other non-smoking areas.

Guarantee that the property outside of your establishment that is under your control is managed as to maintain a smoke-free entrance for customers and employees. This includes entrances to all doors with the exception of emergency exits and outdoor smoking patio doors.

Keep Smoke-Free Arizona Hotline (1-877-AZSTOPS) and website (www.smokefreearizona.org) information handy. Please contact us any time you have a question regarding the new Law!

Checklist – Are you ready?

- ☐ Remove ashtrays
- ☐ Post "no smoking" signs with required information and of the appropriate size(s)
- ☐ Educate employees
- ☐ Prohibit smoking in non-smoking areas
- ☐ Protect enclosed areas from smoke entering from the outside, including from outdoor smoking patios, if applicable
- ☐ Protect all entrances and entryways from smoke
- ☐ Keep Smoke-Free Arizona Program information on hand



Smoke-Free Arizona Program 1-877-AZSTOPS www.smokefreearizona.org





COCONINO COUNTY
DEPARTMENT OF HEALTH SERVICES
 ENVIRONMENTAL SERVICES

Barbara Worgess
 Department Director

Cooling Chart

Food Product							
Date							
Time At 140°F	:	:	:	:	:	:	:
After 1 Hour	Temperature	°F	°F	°F	°F	°F	°F
	Time	:	:	:	:	:	:
After 2 Hours	Temperature	°F	°F	°F	°F	°F	°F
	Time	:	:	:	:	:	:
After 3 Hours	Temperature	°F	°F	°F	°F	°F	°F
	Time	:	:	:	:	:	:
After 4 Hours (Must be 45°F or below)	Temperature	°F	°F	°F	°F	°F	°F
	Time	:	:	:	:	:	:
Critical Limits: Foods must be cooled from 140°F to 45°F within 4 hours							

rg 2/5/04

2500 N FORT VALLEY RD, Bldg #1 • FLAGSTAFF, AZ 86001-9332
 928-226-2710 • FAX 928-226-2711



COCONINO COUNTY HEALTH DEPARTMENT Food Safety Evaluation Form

Critical

Non-Critical

Closed ☐

Time in:

Time out:

FACILITY _____ **ID#** _____

ADDRESS _____ **INS/TYPE** _____

y= yes n= no n/o= not observed n/a= not applicable

Cooking, Holding & Cooling Temperature Controls

1. y n n/o n/a Potentially hazardous foods cooked to proper temperature.
2. y n n/o n/a Cooked potentially hazardous foods held at 140°F or above.
3. y n n/o n/a Potentially hazardous foods reheated properly.
4. y n n/o n/a Cooked potentially hazardous foods cooled properly.
5. y n n/o n/a Potentially hazardous foods held at proper cold temperature.

Food/Equipment	Temp	Food/Equipment	Temp

Employee Health & Hygiene

6. y n n/o n/a Employees hands and exposed arms clean and properly washed.
7. y n n/o n/a Hand washing facilities available and functional.
8. y n n/o n/a Employees using proper hand and arm cleaning procedures.
9. y n n/o n/a Live animals handled properly.
10. y n n/o n/a Person in charge requires employees to report illnesses.
11. y n n/o n/a Employees eating, drinking, or using tobacco only in designated areas.
12. y n n/o n/a Persons with discharges from eyes, nose and mouth prohibited from working with exposed food.
13. y n n/o n/a Food handlers preventing contamination of ready-to-eat food by limiting bare hand contact to approved methods.
14. y n n/o n/a Food handlers tasting food properly.

Food Condition & Source

15. y n n/o n/a All foods are from approved sources, safe, unadulterated and honestly presented
16. y n n/o n/a Food received in proper condition and temperature.
17. y n n/o n/a Shellfish tags kept as required.

Prevention of Contamination

18. y n n/o n/a Food separation, packaging, segregation and substitution methods are preventing food and ingredient contamination.
19. y n n/o n/a Effective food contact controls are preventing food contamination.
20. y n n/o n/a Food contact surfaces and equipment are cleaned frequently and properly to prevent food contamination.
21. y n n/o n/a Food contact surfaces sanitized properly and approved equipment being used.

Date Marking & Disposal

22. y n n/o n/a Foods are correctly date marked.

Consumer Advisories & Protection

23. y n n/o n/a Consumer advisories conducted properly.

Demonstration of Food Safety Knowledge

24. y n n/o n/a Person in charge assigned, and demonstrates adequate food safety knowledge applicable to operation.

Time Only as a Food Safety Control

25. y n n/o n/a Food holding and storage time is within food safety limits.

HACCP Plan Followed

26. y n n/o n/a HACCP plan followed properly .

Standard Operating Procedures

27. y n n/o n/a Other critical items in compliance (if not, specify violations under comment section).
28. y n n/o n/a Non-critical items in compliance.

Comments and corrective action necessary:

Person in Charge _____ Inspector _____ Date _____

Violations:

The total number of critical and non-critical violations must be placed in the box located in the upper right hand corner of the form. A facility must be closed if an imminent health hazard is present, or if a violation(s) is repeated and the facility did not correct within a specified time.

Cooking, Holding & Cooling Temperature Control Points:

1. Potentially hazardous foods cooked to proper temperature (FC §§ 3-401.11 & 3-401.12).
2. Cooked potentially hazardous held at 140°F or above (FC §§ 3-501.16, modified by A.A.C. R9-8-107(B)(26)).
3. Potentially hazardous foods reheated properly (FC §§ 3-403.11)
4. Cooked potentially hazardous foods cooled properly (FC §§ 3-501.14, modified by A.A.C. R9-8-107(B)(25)).
5. Potentially hazardous foods held at proper cooling temperature (FC §§ 3-501.16, modified by A.A.C. R9-8-107(B)(27)).

Employee Health & Hygiene:

6. Employees hands and exposed arms clean and properly washed (FC §§ 2-301.11, 2-301.14).
7. Hand washing facilities available and functional (FC §§ 5-203.11).
8. Employees using proper hand and arm cleaning procedures (FC §§ 2-301.12).
9. Live animals handled properly (FC §§ 2-403.11).
10. Person in charge requires employees to report illnesses (FC §§ 2-201.11).
11. Employees eating, drinking, or using tobacco only in designated areas (FC §§ 2-401.11).
12. Persons with discharges from eyes, nose, and mouth prohibited from working with exposed food (FC §§ 2-401.12).
13. Food handlers preventing contamination of ready to eat food by limiting bare hand contact to approved methods (FC §§ 3-301.11, modified by A.A.C. R9-8-107(B)(20)).
14. Food handler tasting food properly (FC §§ 3-301.12).

Food Condition & Source:

15. All foods are from approved sources, safe, unadulterated and honestly presented (FC §§ 3-101.11, 3-201.11, 3-201.12, 3-201.14, 3-201.15, 3-201.16, 3-201.17, 5-101.11, and 5-101.13 as modified in A.A.C. R9-8-107(B)(32)).
16. Food received in proper condition and temperature (FC §§ 3-202.11 (modified in A.A.C. R9-8-107(B)(12)), 3-202.13, 3-202.14(modified in A.A.C. R9-8-107(B)(13),(14),(15)), 3-202.15, 3-202.16, 3-202.18 (modified in A.A.C. R9-8-107(B)(17))).
17. Shellfish tags kept as required (FC §§ 3-203.12 as modified in A.A.C. R9-8-107(B)(19)).

Prevention of contamination:

18. Effective food separation, packaging, segregation, and substitution methods are preventing food and ingredient contamination (FC §§ 3-302.11, 3-302.13, 3-302.14).
19. Effective food contact controls are preventing contamination (FC §§ 3-304.11, 3-306.13, 3-306.14).
20. Food contact surfaces and equipment are cleaned frequently and properly to prevent food contamination (FC §§ 4-601.11, 4-602.11 (modified in A.A.C. R9-8-107(B)(31))).
21. Food contact surfaces sanitized properly and approved equipment being used (FC §§ 4-702.11, 4-703.11, 5-101.12, 5-201.11, 5-202.11).

Date Marking and Disposal:

22. Foods are correctly date marked (FC §§ 3-501.17, 3-501.18).

Consumer Advisories:

23. Consumer advisories conducted properly (FC §§ 3-603.11 as modified in A.A.C. R9-8-107(B)(29)).

Demonstration of Food Safety Knowledge:

24. Person in charge assigned, and demonstrates adequate food safety knowledge applicable to operation (FC §§ 2-101.11, 2-102.11)

Time as a Food Safety Control:

25. Food holding and storage time is within food safety limits (FC §§ 3-501.19).

HACCP Plan Followed:

26. HACCP plan is followed properly (if applicable) (FC §§ 8-103.12)

Standard Operating Procedures:

27. Other critical items in compliance (Other items listed as critical in the 2001 Coconino County Food Code).
28. Non-critical items in compliance in the 2001 Coconino County Food Code.

Notes



REFERENCES

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7. Christensen, C. 1989. *Technician's Handbook*. Cleveland: Franz and Foster Company.
8. Ebeling, W. 1975. *Urban Entomology*. University of California, Division of Agricultural Sciences.
9. Hahn, J., D. Lewis, and P. Pellitteri. 1997. *Insect Pests of Stored Foods*. University of Florida Cooperative Extension, FO-01000.
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Notes